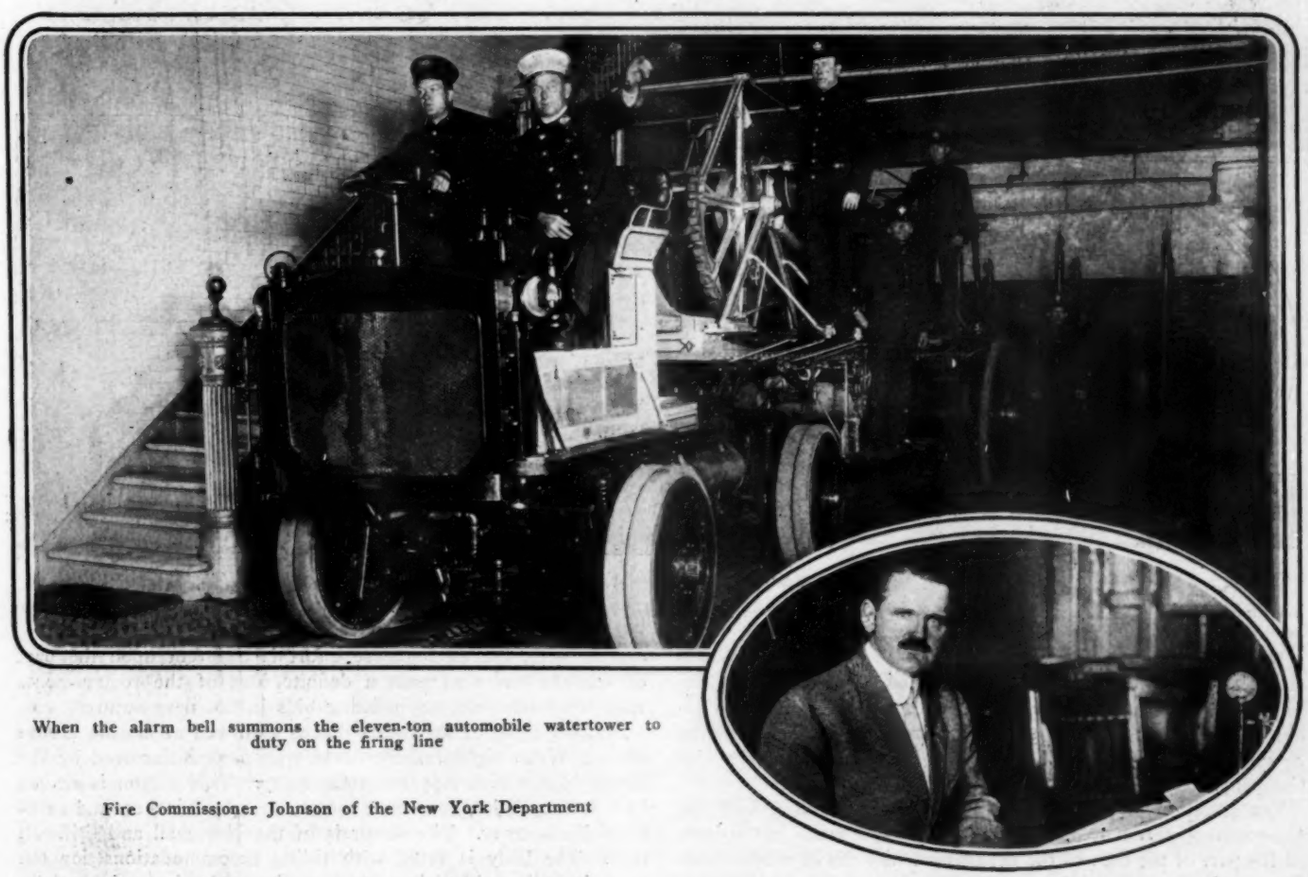
VOL. XXV NEW YORK—THURSDAY, SEPTEMBER 7, 1911—CHICAGO No. 10

THE AUTOMOBILE

Motorizing Gotham's Fire Apparatus

Past, Present and Future of Power Equipment

Commissioner Johnson of the New York Fire Department is handling a campaign which has for its objective point the installation of 150 pieces of automobile driven fire-fighting machines of all varieties. Twenty-nine pieces are now in commission throughout the five boroughs and by March 1, 1912, it is expected that there will be 100 more in service and at least fifty additional by the end of next year.



When the alarm bell summons the eleven-ton automobile watertower to duty on the firing line

Fire Commissioner Johnson of the New York Department

MOTORIZATION of the New York Fire Department is probably the most important step that will be taken in the immediate future as far as the progress of the automobile as a factor of utility work is concerned. The undertaking is gigantic and marks the commencement of a new era in the use of the automobile in municipal work. Not that there is not already much use being made of the automobile in fighting fires, because a start in that direction has been made and power-driven fire-fighting apparatus has been installed widely and has proved efficacious; but the future holds an immense significance along that line and progress indicated by the recent action of Fire Commissioner Johnson in preparing for the installation of 150 pieces of apparatus depending upon gasoline power for their propelling force shows that the pioneer work has borne fruit

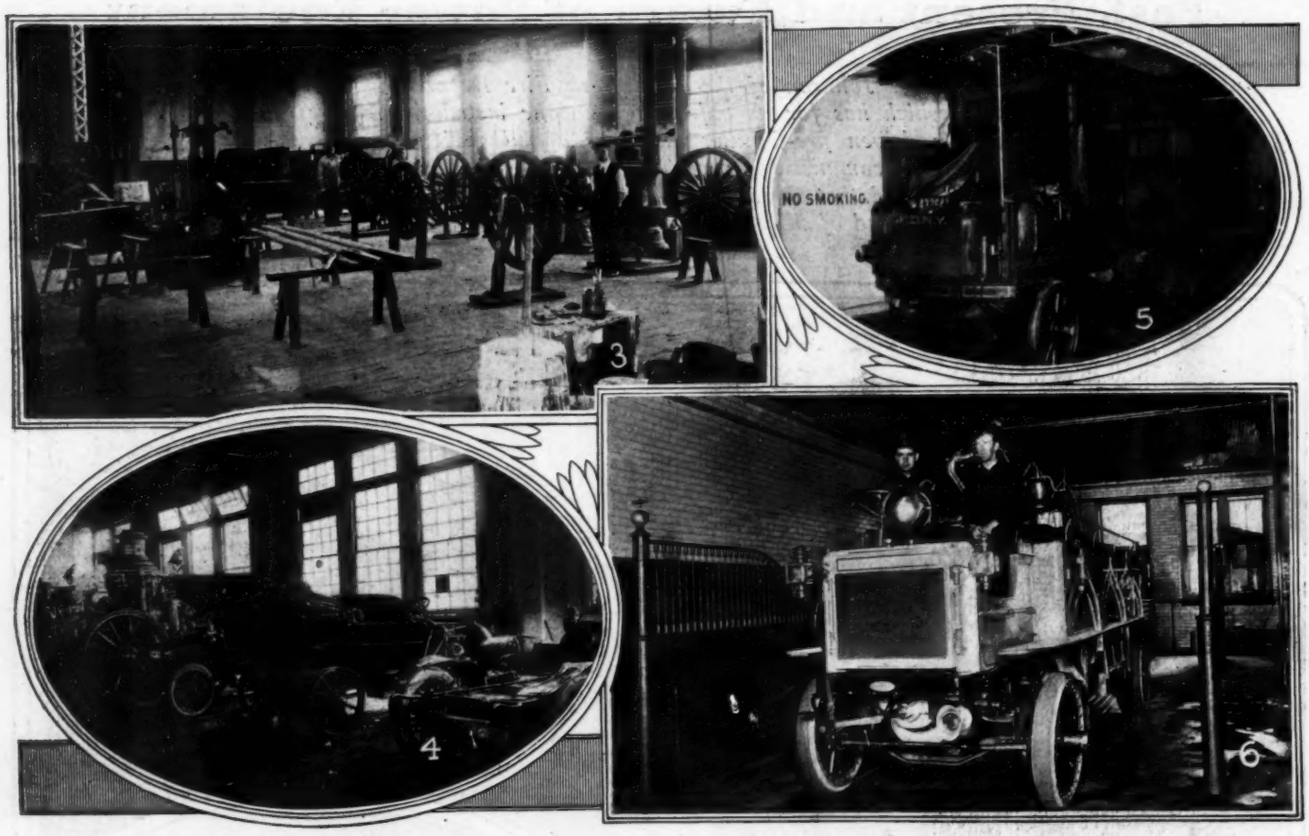
and the universal vogue of the fire automobile is now at hand.

When 1913 opens the Fire Department of New York City will have by far the most complete equipment of automobile fire-fighting machines in the world. The city has tested and tried various makes of machines and to-day has twenty-nine cars in the department's service. Of these, nineteen are touring cars and runabouts used in transporting the commanding officers to their stations of duty at fires and elsewhere. The remainder are in fire-fighting service and include one Nott tractor of 110 horsepower attached to a steam engine, three Webb high-pressure hose wagons equipped with 66-horsepower motors, one Knox high-pressure hose wagon of 50 horsepower, one Couple-Gear water-tower, the motor of which is operated by electric current developed by a 40-horsepower, four-cylinder gasoline engine, two Victor trucks used as supply wagons and equipped with special stake bodies and two Knox trucks in the same branch of service. All four of the latter wagons are of 1 1-2 tons capacity.

shod with tires 48 by 6 inches. The motor is a marvel of size, the four cylinders measuring 5 3-4 by 8 inches and developing 110 horsepower on the brake test. This engine has been in the repair shop for twelve days since it was put in service, the result of an accident that caused a leak in the radiator. Otherwise it has given not an atom of trouble to its crew. David J. Oliver, who drives the immense automobile, had a large share in its assembly, going on to the factory to familiarize himself with the mechanical details of the motor. The district in which the Nott engine is stationed has more than the average amount of work and on a basis of 500 miles since the engine was put into commission the yearly mileage would be in the neighborhood of 1,000.

In buying motor apparatus the department is not providing for one or two years of service, but is working for equipment that will last for many years under the excellent care that is given all fire apparatus and the limited mileage required of it.

The requirements of the department are high and hard to



3—Painting section of the big repair department for motor apparatus
4—Automobiles of the department as well as fire apparatus need repairs
5—Knox 1½-ton truck used as a supply wagon, displacing six horses
6—Webb high-pressure hose wagon stationed in "58's" house

During the rain last week a representative of THE AUTOMOBILE with a staff photographer made the rounds of the fire houses to obtain data and illustrations for this article, using a 32-horsepower Moon car of 1912 model, which was furnished by the courtesy of the New York branch of the Moon Motor Car Company.

The situation at present indicates much satisfaction with the apparatus operated by mechanical power and much enthusiasm on the part of the men of the department who are in contact with the machines.

At Engine Company 58, on One Hundred and Fifteenth street, near Lenox avenue, is stationed the solitary steamer owned by the department. This engine is attached to the Nott tractor, and since last March, when it was installed, it has traveled nearly 500 miles in fire service. The complete apparatus weights about nine tons. The rear wheels are fitted with the biggest solid tires ever made, they being 60 by 6 inches, while the front wheels are

comply with, but an immense effort is apparent upon the part of manufacturers to gain a definite idea of the requirements with the intention of submitting bids in the near future.

Another piece of apparatus that is stationed at Engine House 58 is a Webb high-pressure horse wagon, manufactured by the Webb Motor Fire Apparatus Company. This wagon is driven by a four-cylinder, four-cycle motor, 5 1-4 by 6 inches, and rated at 66 horsepower. The motor is of the Herschell and Stillman type. The body is fitted with riding accommodations for ten men, including the driver, and carries 2,100 feet of specially strong three-inch hose. In the high-pressure district of New York no pumping engine is required to throw water high into the highest of the skyscrapers. It is said that the pressure is sufficient to raise water over 200 feet without the aid of pumps. In a cradle back of the driver rests a giant nozzle which has four connections to which leaders from the high-pressure mains may be attached.

The car is comparatively light and has high speed, and so far has shown some creditable work in service.

There is another Webb wagon at Engine House 72, on Twelfth street, near University place, and still another is in the supply department ready to be assigned a regular station on the fighting line. At 72's house there is also a Knox high-pressure hose wagon similar in body design to the Webb, but with a 50-horsepower motor.

The biggest piece of fire-fighting machinery in the equipment of the department is the watertower No. 1, stationed at 31's engine house on Lafayette street.

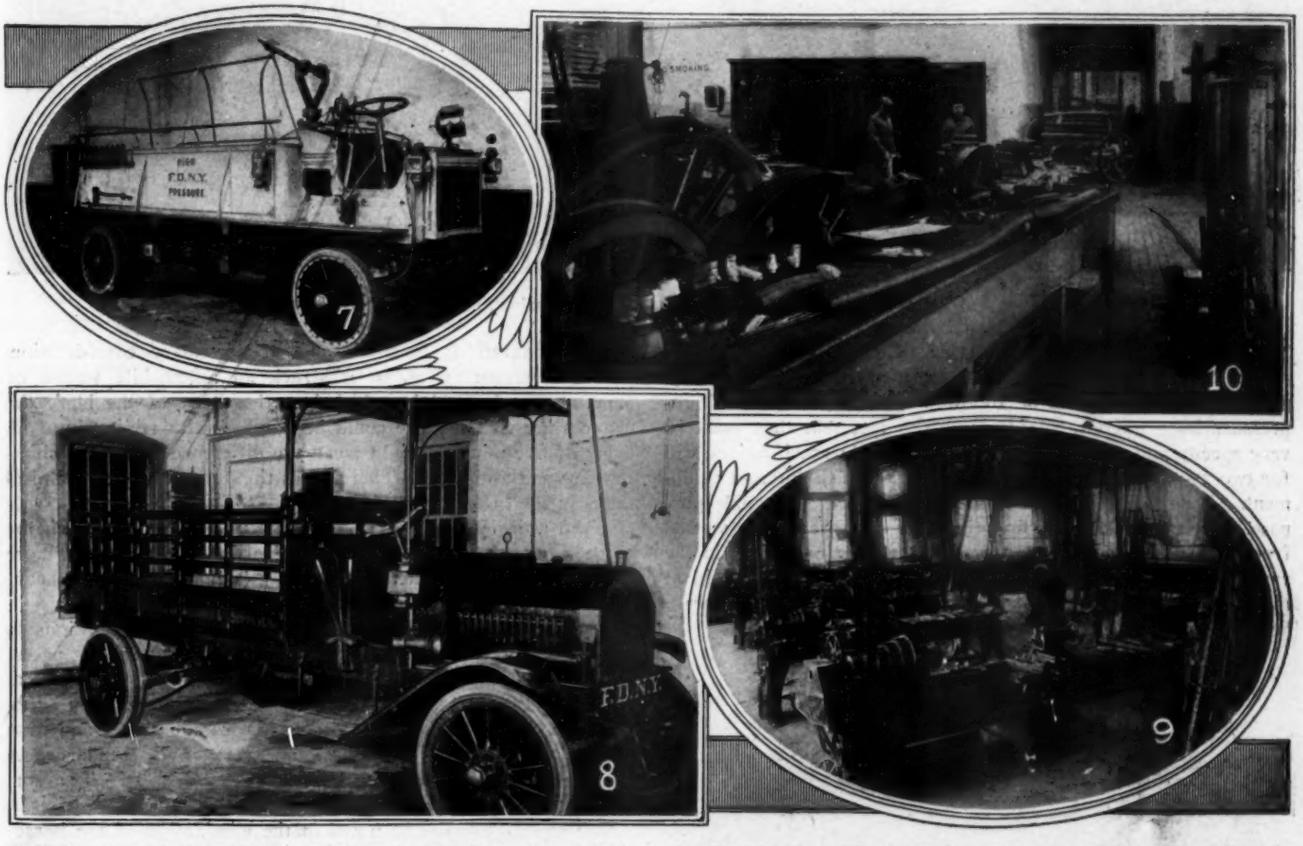
This machine is driven by a Couple-Gear motor and all told weighs 11 tons. The electric power is generated by a gasoline motor and each wheel is driven by its own power device.

The body carries a watertower arranged to be raised and lowered on a quadrant base. The vehicle is said to be capable of an average speed of 15 miles an hour.

contains a school room which is being used for the instruction of chauffeurs and mechanics to drive and care for the motor-driven apparatus.

Last Thursday Professor Butler was completing the instruction of a class of firemen at the time of the visit of the representative of THE AUTOMOBILE. This class has finished its work in ignition, lubrication and other studies that may be pursued indoors and during this week will take up the driving instruction and actual repair work.

So much for the present equipment of the department. The indications for the future are for a condition that seems almost revolutionary. The department has three-quarters of a million dollars to spend for motor fire engines of various styles, sizes and duties and the specifications for the first batch of apparatus are being prepared by the technical board, which consists of Deputy Fire Commissioner P. P. Farley, chairman; Chief Kenlon, Battalion Chief J. P. Howe and Captain Demarest. This



7—Webb wagon of 66-horsepower awaiting assignment in the line of battle
8—Victor truck of 1½ tons and 30 horsepower used as a supply wagon
10—The machine tools of the department are sufficient for much work
9—Where the tires of the fire department are adjusted and inspected

Some idea of the advancement in fire fighting that is shown by the operation of these immense wagons may be realized when one remembers that the limit of size for horse-drawn engines and equipment was marked at three tons. The engine at 58 weighs nine tons and the watertower weighs eleven tons, with all that those figures mean in the way of added power, speed and efficiency.

The other four wagons in present use are the 1 1-2-ton trucks assigned to the supply department under general charge of Captain Charles S. Demarest, chief of the bureau of repairs.

Captain Demarest's headquarters are at the foot of West Fifty-sixth street, where the fire department has a very complete repair and service department.

There is a special room devoted to each branch of repair, including a room for chassis assembling, forge room, foundry, storage and garage, machine tools, tires, body work, painting and varnishing and testing. Besides these branches, the department

lot of equipment will probably include about ten pieces and the chances are that they will be installed before the last of the year. During the interim specifications for other lots will be framed and delivery will be available at short intervals during the Winter. It is expected that about 100 pieces will be ready for service by March 1, 1912. By the first of 1913 it is expected that the department will have in service at least 150 pieces of motor machinery.

Among the companies that are taking a keen interest in the proceedings of the technical board and which are in constant touch with its activities are the following: Peerless, Garford, Gramm, Nott, Knox, Webb, Watrous, Ford, Lozier, Packard, White Combination Hook and Ladder and the Couple-Gear. All of these companies and many others will be represented at Milwaukee from September 19 to 28 when the annual convention of fire chiefs will be in session. This year the exhibition of power-driven wagons and pumps and all other types of fire-

110-horsepower Nott tractor ready to pull its pumping engine to the fire

fighting apparatus will be vastly more complete than ever before.

The New York department has practically decided upon the general lines that should be followed with respect to the high-pressure hose wagons. Aside from the fact that they must be very speedy and comparatively light, the body specifications call for two 35-gallon chemical tanks in addition to the present equipment. Thus the wagons of this type could serve a double purpose. The most disastrous fires that ever destroyed a city started from a small blaze or at least could have been controlled in the vast majority of instances by a swift dose of chemical fluid at their inception. Of course in the case of a fire starting from a fierce explosion the matter would be different, but the number of such conflagrations is small and of secondary consideration.

The Foundry, a special feature of the Fire Department service section

If the instant an alarm is struck an automobile wagon of supreme speed could be whirled to the scene of the blaze the chances are that the fire could be handled with trifling loss. A delay of five minutes might mean the difference between a chimney fire and a disaster. Therein lies the purpose of the chemical tanks in the hose wagons.

Seven more Webb wagons, identical in general lines with the three now in service, have been ordered and three more Couple-Gear trucks like the one at 31's house have been contracted for. These will be used for aerial ladders, etc.

Commissioner Johnson's plans for the wholesale additions to the present motor-propelled fire-fighting apparatus do not necessarily include standardizing any of the automobile apparatus at present in the department. The matter of standardization is being taken up by the board named by the commissioner and tests will be held to determine the best general types for standards. A new kind of apparatus is in contemplation which will be a sort of scout automobile chemical engine for the outlying districts.

One effect that will be noted in the elimination of the horse-drawn vehicles will be the lengthening of the aerial ladders and the increase in size and efficiency of the trucks used for that service.

Some of the best-informed men in the department favor automobile tractors upon which the fifth wheel of the present steam pumping engine can be placed. This would make it possible to disconnect the pump from the tractor in case of accident and substitute horses for the mechanical power. No gasoline pumping engines have answered the requirements of the department so far in the matter of volume of water thrown, but much effort is being made to perfect such a device.

Twenty-one new fire houses have been ordered by Commissioner Johnson and these will be equipped with motor apparatus. In addition to these automobile apparatus will be installed in a number of existing fire houses, thus doing away with horse equipment gradually.

Of the first 100 pieces to be purchased by the department it is likely that there will be twenty pumping engines or tractors drawing steam pumping engines, all of which, of course, will be motor-

hose wagons, scout chemicals and a few cars for the transportation of administrative heads.

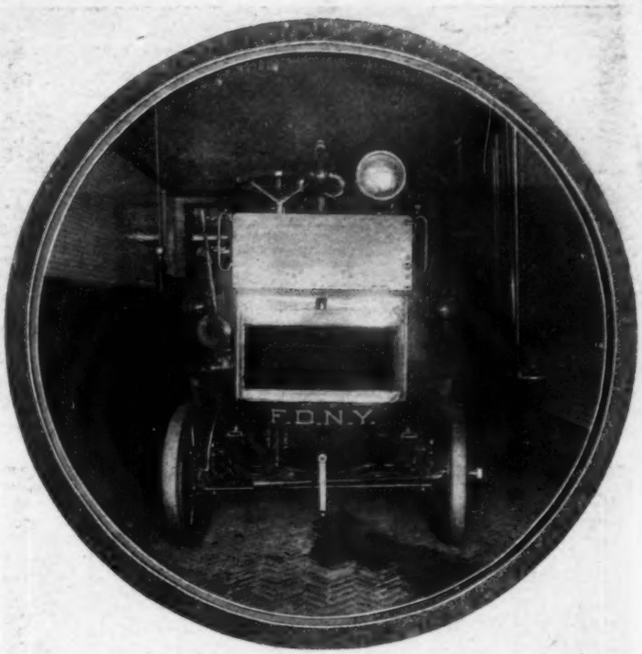
The high-pressure zone is being extended and eventually will cover all the congested districts, thus widening the field of usefulness for the hose wagon equipped with a giant nozzle and capable of taking the streams from four or more plugs.

The main advantages to be found in automobile apparatus consist in their higher speed, which allows a wider radius of action, higher efficiency because of the increased power and speed and lowest cost. The records of the department show that the average up-keep and maintenance of a three-horse team and apparatus is about $1,080 annually. This includes shoeing and feeding the horses and overhauling and repairing the apparatus.

A high-pressure hose wagon of corresponding type to the above would cost less than $100 for gasoline, oil, grease and mechanical attention and repairs, including tires. Thus the taxpayers would save $1,000 a year on the operation of each wagon that displaces three horses. In addition they gain augmented protection because of the speed of the wagons in getting to the scene of hostilities and the increased efficiency of the fire-fighting equipment itself.

Of course there would not be as much as $1,000 difference between the cost of operating a tractor drawing a steam engine and a horse-drawn steamer, because the water in the boiler has to be kept hot all the time, no matter what the motive power of the apparatus. But even on that basis there is a sharp economy shown by the elimination of the horses that formerly pulled the steam pumps. It is likely that the saving would amount to $700. It is easily figured that the department will save at least $120,000 a year when the 150 pieces of motor-driven apparatus have been installed.

The men who are connected with the companies to which automobile engines and wagons have been assigned are enthusiastically in favor of them. The absence of horses from such fire houses is a welcome relief to the noses of the men and the lack of flies is certainly appreciated by the men who are obliged to sleep in daytime. No matter how much a man may love the horse he hates to clean him, and no matter how educated the sense of smell may be nobody to date has confessed to liking the strong ammoniacal odor inseparable from horses.

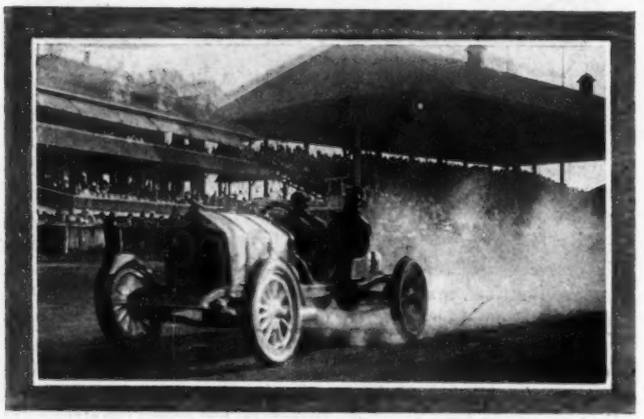


Knox hose wagon, a 50-horsepower truck assigned to Engine House 72

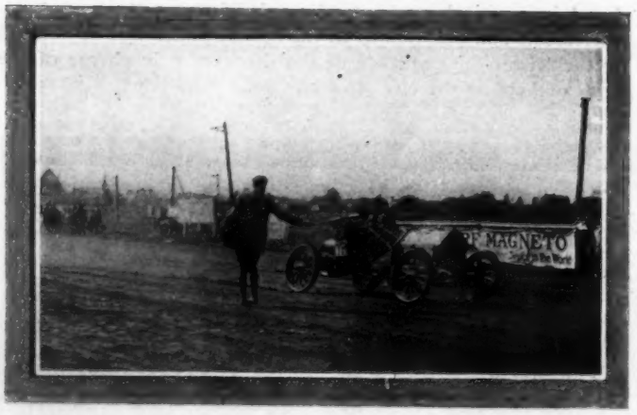
The streets of New York, particularly in the congested, high-pressure districts, are in fearful condition for fast operation and the commissioner has entered protest with the borough officials. The strain on automobile mechanism traversing some of the rough streets is almost impossible to sustain and is most unfair in the way of a test of efficiency. So far the various engines and other apparatus have stood up staunchly, but unless the streets are repaired or paved the usefulness of such apparatus will be reduced in a pitiful manner and much of the well-intended improvements and innovations of the commissioner will be nullified by the *laissez-faire* attitude of the department in charge of the work of keeping the city streets in good condition.

First class in the school for driver-mechanics conducted by the department

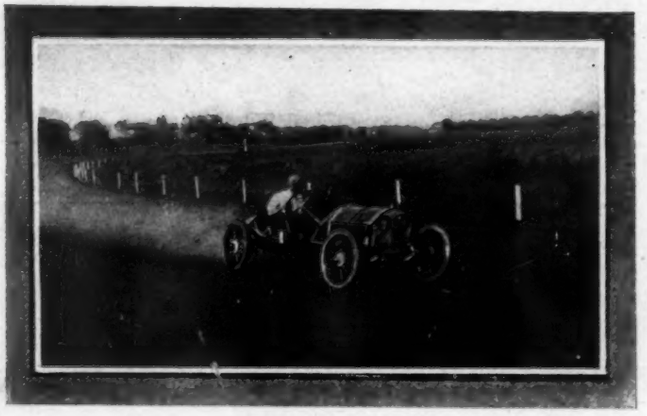
Showing the start of the five-mile handicap race (from behind)



National, driven by Sheets, passing the grandstand



The winning E-M-F car finishing the first event on the first day



Mercer No. 22 on the homestretch in the 50-mile race (Monday)

World's Records

Blitzen Benz Sets

During the two-day automobile meeting Burman in the giant Benz car established a a circular dirt track. There was a great on Saturday. The fields in all the races except Saturday were wide, while on Monday they

NEW MARKS were set for the one and two-mile distances on circular dirt tracks at the two-day automobile race meeting that came to a close on Labor Day at Brighton Beach. The Blitzen Benz, driven by Burman on Saturday, reduced the two-mile record to 1:37.89, knocking off about three seconds from the best previous time for the distance. On Labor Day the same car and driver clipped 1-10 of a second from the mile distance, making the circuit in 48.62 seconds.

The track was in better shape than ever before, especially on the final day, and with good weather two big crowds turned out to enjoy the sport. There were probably 15,000 paid admissions during both days. Only one accident happened and that was not serious. This incident came off in the final race on Labor Day, when Spencer Wishart, in his big Mercedes, attempted to catch the flying Mercer in the handicap race. The car blew a right rear tire at the club house turn and plunged through the fence overturning with the young millionaire. It was in the last lap of the race, which probably accounts for the lack of fatalities, for to the amazement of the big crowd, no sooner had the car capsized in the ditch than an ambulance dashed out on the track among the rushing contestants and galloped up to the prostrate Mercedes. Wishart certainly would have been no worse than second but for the accident.

Of the racing there is little to be said. On the first day the finishes were all tame and on the second they were all close. They were so tame on the first day that the spectators lost interest to a great extent save in the first heat for the Remy Bras-

FIRST DAY'S SUMMARIES

Five Miles, for Cars of 161-230 Cubic Inches

No.	Car.	Driver.	Position.	Time.
16	E-M-F	Tower	1	5:55.36
9	Paige-Detroit	Craig	2	
11	Penn "30"	Ainslie	3	
51	Jackson	McBride	4	
12	Lancia	Ferguson	5	

Five Miles, for Cars of 231-300 Cubic Inches

22	Mercer	Hughes	1	5:22.56
2	Correja	Foster	2	
17	Schacht	Gray	3	

Five Miles, for Cars of 301-450 Cubic Inches

20	National	Sheets	1	4:51.80
46	Benz	Disbrow	2	
15	Jackson	Cobe	3	
52	Jackson	Regan	4	

Two Mile Time Trial Against Mark of 1:40.55 World's Record

1	Benz	Burman		1:37.89

Five Miles, for Cars Under 600 Cubic Inches

20	National	Sheets	1	5:27.67
15	Jackson	Cobe	2	

Three Miles Free-for-All, Flying Start, First Heat Remy Brassard

4	Benz	Burman	1	2:57.04
3	Mercedes	Disbrow	2	
8	Hotchkiss	Kilpatrick	3	

Fifty Miles, for Cars Under 600 Cubic Inches for W. B. Trophy

14	Opel	Burman	1	50:07.13
22	Mercer	Hughes	2	
15	Jackson	Cobe		
20	National	Sheets		

Five Miles Handicap

4	Benz (scratch)	Burman	1	5:25.25
22	Mercer	Hughes	2	
16	E-M-F	Tower	3	

Correja, Hotchkiss, Paige, Lancia, National, Regal, Jackson and Opel also ran.

Fall at Brighton

New Marks Sprinting

at Brighton Beach, which ended Labor Day, new level for the one and two-mile circuits of crowd present on Monday and a good one the handicaps were small and the finishes on were of the eyelash variety.

sard and trophy. In this event three entries from the Moross string constituted the field and the most carping critic could not wish for a prettier race or a more stirring finish. In fact all three cars led at one stage or another and a blanket could have covered them at the finish. It was highly artistic, particularly Disbrow's driving of the Mercedes representative of the string. The final heat was also a spectacular triumph with the result never in the least doubt but the winning margin was slight. The big crowd was somewhat astonished when it was announced that the Moross Mercedes was to be driven by Oldfield, but their fears were quieted when it was learned that the driver was not the redoubtable Barney, now under the official ban.

Close finishes were the order of the day in the final session. In fact, it seemed as if the "order" was followed a trifle too literally. In several of the races the winner lay off the pace and just nosed out the second horse in furious drives that aroused much enthusiasm. The first event was taken by an E-M-F, or rather the E-M-F which just galloped all the way and won going away. The Mercer took the second without much of a struggle and National 20 annexed the third class race. The same car also won the big class event in comfortable style. The first heat of the Brassard contest was won by the Benz in a nose finish with its stable mates, the Jenatzy Mercedes and the 200-horsepower Hotchkiss.

The 50-mile feature brought out a field of four cars including an Opel, Mercer, National and Jackson. The Opel set a fast pace for five miles when it was headed for a moment by the

SECOND DAY'S SUMMARIES

Five Miles, for Cars of 161-230 Cubic Inches

No.	Car.	Driver	Position	Time
16	E-M-F	Tower	1	5:45.13
9	Paige-Detroit	Craig	2	
11	Penn "30"	Ainslie	3	
12	Lancia	Ferguson	4	

Mile Time Trial Against World's Record of 48.72

1	Benz	Burman		48:62

Five Miles, for Cars of 231-300 Cubic Inches

22	Mercer	Hughes	1	5:35.10
17	Schacht	Gray	2	

Five Miles, for Cars of 301-450 Cubic Inches

14	Opel	Burman	1	5:02.96
46	Benz	Oldfield	2	
20	National	Sheets	3	

Final Heat Remy Brassard, Three Miles

4	Benz	Burman	1	2:50.90
3	Mercedes	Oldfield	2	
8	Hotchkiss	Kilpatrick	3	

Ten Miles, for Cars Under 600 Cubic Inches

14	Opel	Burman	1	9:43.30
11	Mercedes	Wishart	2	
22	Mercer	Hughes	3	
20	National	Sheets		

Five Miles Free-for-All Handicap

22	Mercer	Hughes	1	5:14.31
16	E M-F	Tower	2	
20	National	Sheets	3	

Paige, Penn, Lancia, Hotchkiss, Mercedes, Regal and Benz also ran.

Fifty Miles, for Cars Under 600 Cubic Inches

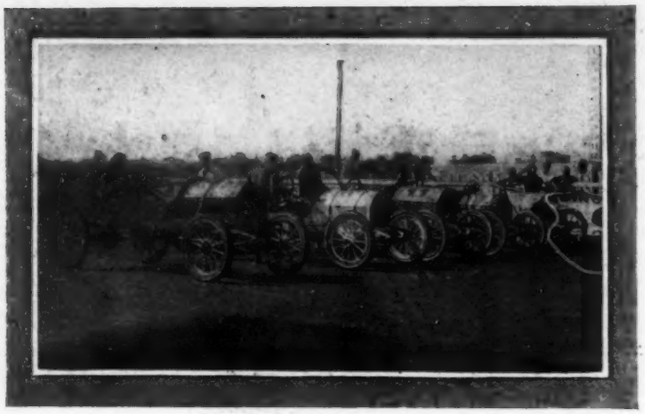
22	Mercer	Hughes	1	49:56.06
11	Mercedes	Wishart	2	
20	National	Sheets	3	
14	Opel	Burman		

Hotchkiss No. 8 doing the clubhouse turn in Remy Brassard race

Some five hundred cars parked at Brighton Beach on Saturday

Burman in Benz breaking one-mile track record in 48.62 seconds

Opel (Burman) and Benz (Oldfield) in a close finish



Jackson, Paige-Detroit, Penn "30," Lancia and E-M-F (wniner) lined up for small car race

Mercer and then reassumed the lead clear to the wire. The National suffered tire trouble early and often and was afflicted with a sooty spark plug in the middle distance, losing eleven laps during the tire changes. The Jackson pursued a troubled course for half the distance and retired from what was announced to be carbureter troubles. The Opel ran steadily and quietly from start to finish, closely accompanied by the Mercer, until the forty-seventh mile, when a dangerous blow-out on the clubhouse turn caused the loss of over a lap. Hughes handled his car in masterly style and after limping around to the paddock made a wonderfully quick tire change and was out on the track again in pursuit of the curious looking German car. The Opel won eased up in 50:07.13, slightly less than 60 miles an hour.

The last race of the first day was the prettiest on the card. It was a free-for-all handicap and a Benz car from scratch proved the winner, getting up in time to defeat the Mercer and E-M-F in a wild drive.

The second day's card furnished a series of the most remarkable finishes ever seen in any automobile races. The E-M-F lay second and third for four and a half miles, taking the dust of the Paige-Detroit and part of the time trailing the Penn 30. But when the final run came along Tower moved up quickly and swung into the stretch on even terms with the pacemaker. From there to the wire it was a hair-raising struggle with the honors going to E-M-F.

In the second race it seemed impossible to make a contest with only the Mercer and Schacht entered, but Hughes in the Mercer proved the fallacy of such a supposition. The Schacht led for part of the distance or until the Scotch driver was ready to get into action and then there was nothing much to it but the Mercer.

The Opel showed its quality in the third class event by winning from a Benz and a National. Burman at the wheel of the winner was first at the wire rather easily by a very tight margin, with Oldfield in the Benz just far enough away to get second money. As has been recounted, the final heat of the Remy Brassard was another magnificent triumph of art and clever driving by all three of the Moross pilots.

The ten-mile event for big cars brought a field of four to the line, including the Opel, National, Mercer and the big Mercedes racer owned and driven by Spencer Wishart in the recent 500-mile sweepstakes at Indianapolis. The Opel made the pace all the way, but the Mercedes kept shooting at the leader on every turn only succumbing at the very end. The Mercer was a close third the National going out with a puncture on the first turn.

The fifty-mile race went to the Mercer, after the Mercedes had suffered its second blowout. The pursuit of the low-hung yellow automobile driven with supreme skill by Hughes, by the big-hooded gray racing car was extremely interesting. Hughes never took a chance and when he found that his rival had eliminated himself from first place, barring a broken axle or something of the sort, he finished the distance easing up and allowing the Mercedes to regain a lap.

The last race of the day and meet looked like a tragedy for a minute during the last lap of the free-for-all handicap. There was a big field on the track and the Mercer had gradually worked through the small fry and was out in front passing the stand on the last lap. Up the stretch was the E-M-F that had shot its bolt and directly behind the Michigan car came the National and the Wishart Mercedes. The National was going well for the first time during the day and Wishart was pushing the German car to the limit. The National was on the rail and when Wishart opened up at the wire the Mercedes shot ahead and took a long slant for the first turn, intending to displace the National and close the gap on the leader. Wishart made a quick rush for the turn, but was so close to the National after taking the rail position that the National was obliged to hold hard and shut off.

Suddenly the stands were electrified by the sound of a tire explosion and out of the cloud of dust the big gray car was seen to make a dive diagonally across the track. Clear to the pole the car shot with the driver doing manful work in an endeavor to hold it on the track. Just for a second it seemed as if he would succeed and then a cloud of fence rails and splittered posts told the tale of going through the fence.

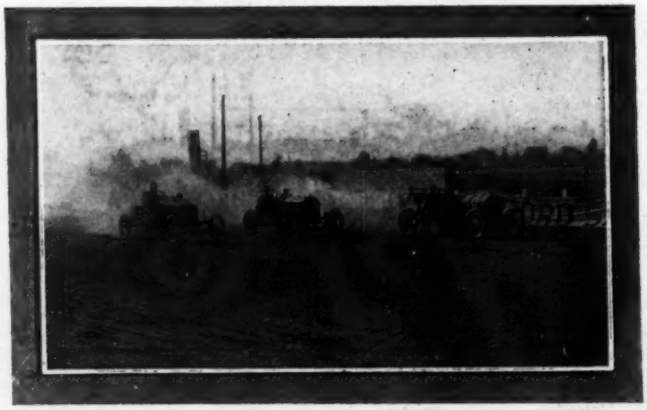
The car tottered on the side of the ditch and then turned over, Wishart leaping out in safety. The extraordinary proceeding anent the visit of the ambulance among a dozen racing automobiles has been told. Just why the driver did not take the regular road is one of those mysteries for which there is no explanation. At any rate he did not do so, but nobody was hurt. The meeting was a glittering success from the financial and artistic viewpoints and the public got a great big measure of interesting spectacles.

Preparing for Chicago's Six-Day Run

CHICAGO, Sept. 3—The pathfinding trip for the Chicago Motor Club's reliability run was completed to-day when the Halladay scout car carrying John P. Dods of the Official *Automobile Blue Book* and his staff drove in from Grand Rapids, Mich.

Several changes have been made in the original route laid out, particularly on the second day. Instead of going from Indianapolis through Terre Haute and Vincennes to French Lick, stopping half of Sunday at the last-named place, then driving to Louisville in the afternoon, it has been decided to go south to Seymour via Franklin and Columbus, then west through Brownstown to Bedford, Salem, Pekin, Borden, New Albany to Louisville, where Sunday will be spent. The third day's run will be from Louisville to Cincinnati, the fourth day to Columbus, the fifth day to Detroit, the sixth day to Grand Rapids and the seventh home, a distance of approximately 1,400 miles.

The run will be a stock-car proposition and will be a grade 1 event with technical penalties and technical examinations to determine the winners. There will be two divisions, one for touring cars and the other for runabouts, while in addition there will be a team trophy and a fuel economy prize.



National (Sheets), Mercedes (Wishart) and Opel (Burman) in the fifty-mile race on Labor Day

A Plethora of Valveless Ideas

Differing Materially From Conventional Practice

In the series of valveless motors illustrated in this motor one thing that will strike the reader is that they differ in many ways from what has already been done along this line. Who knows but what among the apparently impossible propositions that have been evolved in the last few years there resides the basic principle of an entirely practical, successful motor.

THE man who said "There is nothing new under the sun" might have modified his ideas if he had lived in the twentieth century. There is no doubt that the proposition of evolving something new in the endeavor to create a motor that will do away with the poppet valve has given a good deal of food for thought to the inventively inclined.

Martin Uses a Rotary Valve Consisting of a Split Ring

The objects of the invention shown in Fig. CC are to balance the valve carrier and construct a valve in such a manner as to avoid pressure thereon, and to provide a silent-working mechanism of simple construction for controlling the gases to and from the cylinders. (A) in Fig. CC represents a transverse section of a cylinder of the motor. The working cylinder A has two ports, B and B1, which first act as inlet ports and then as exhaust ports. C represents the valve casing, and the rotating valve shaft E is carried in the bearing D. F and G represent the inlet and exhaust passageways in the valve casing. H and H1 act as valve carriers. The split rings I are formed in the shape of tubes, and each has a gap at I1 between its edges, being open at both ends. The valve finds a seating at C1, and C2 is one of the passageways in the valve casing which place the valve in communication with the cylinders. The valve carrier H is formed with disc-shaped ends H2, which fit against the cylindrical interior of the valve casing, and are held in position by the valve covers D1. Each pair of these discs H2 is connected by a central portion or rod of reduced sectional area, which at its center is provided with a disc H forming the valve carrier. Around recesses H3 in the exterior of the valve carrier H are pinned the split rings or valves I, which by being placed in the recess H3 are properly balanced. This construction prevents pressure from getting inside the valve ring I and expanding against the valve seating. The valve carriers H have grooves cut in them. The intake and exhaust ports F and G are placed in the head of the cylinder,

Oscillating Valve with Shuttle Cam of French Design

The principle involved in the design of the motor shown in Fig. CD is applicable to cylinders with the valves in double file, as well as in the single file form illustrated. The valve V acts as a distributor valve, controlling both inlet and exhaust ports by its reciprocating motion, which is effected by a shuttle cam C through the medium of a roller R carried by the oscillating foot F of the valve spindle. The motion may also be imparted by an adjustable bell crank with a hardened toe-piece in contact with and rocked by a cam of conventional form. During the reciprocating movement, excepting when subjected to the pressure of compression and explosion, the valve is relieved of contact by a coiled spring S interposed in the vertical shaft S1, the latter being split for that purpose. The shape of the valve V is shown in the plan view of a cylinder B in Fig. CD. The working cylinder A has a port P, and as the valve V reciprocates, the inlet and exhaust passageways are uncovered, placing the cylinder in communication with them.

Ward Motor Has Sliding Block in the Cylinder Head

The method of controlling the gases in the motor designed by W. C. Ward is shown in Fig. CE. The cylinder wall is cast with a lug L1, which acts as a bearing to the upper end of the vertical shaft S, which is driven by suitable means from the crankshaft at half-speed thereof. The upper extremity of the shaft carries a cam-shaped disc A, with a specially grooved slot B cut therein, in which is engaged a roller C of the slide valve D. The valve proper is formed with exhaust ports E and F, and a transverse web G which has an enlarged foot to cover the cylinder port J during the time that the motor is compressing and exploding the gases. The cam A being rotated, the valve D will move to the left, which will place the port J of the cylinder into communication with the exhaust ports E and F, allowing the burned gases to find an exit through the passage K in the cylinder head, which, as will be seen, is amply provided with water-jacketing surfaces. The continued rotation of the cam A draws the valve D in the opposite direction (to the right); when the foot of the transverse web G passes over the port J, the latter will be placed in communication with the valve chest L and the induction manifold through the port N.

A Combination of a Rotary and Poppet Valve

The section of the head of a cylinder shown in Fig. CF is the invention of W. McLeod, Coventry, England, and shows how a poppet valve has been combined with a rotary shutter valve in controlling the gases. As will be seen in Fig. CF, it consists of a single poppet valve of unusually large size which controls the opening of the exhaust and closing of the induction, and a rotary valve which controls the operations of closing the exhaust and opening of the intake. The valve setting, which is taken from the *Autocar*, is shown in Fig. CG. The rotary valve runs at half engine speed and has but one port, which is of slightly oblong shape. At the point where the exhaust opens the port of the rotary valve coincides with the exhaust passage, so that on the poppet valve A being depressed by the cam J there is a free exit for the burned gases. The cam J holds the poppet valve open while the rotary valve continues its revoltuion until the port is closed, thereby finishing the period of exhaust. Continuing its rotation, the intake port is placed in communicaion with the cylinder through the slot in the rotary valve and as the poppet valve has been held open all this time, this closes when the piston has started to ascend on the compression stroke. During the compression and working strokes of the piston, the poppet valve is held closed by the spring S, the rotary valve, however, continuing to rotate, so that by the time the piston has descended and is within 42 degrees of the bottom of its stroke, the poppet valve again opens, placing the port P in communication with the cylinder.

The rotary valve in this motor is entirely unaffected by the pressures in the cylinders, as during compression and explosion strokes it is covered by the poppet valve A. The poppet valve remains open twice as long as is the case in the ordinary arrangement and owing to its large diameter only a small lift is

necessary. The method of operating the valves can be seen by referring to Fig. CF. The shaft is caused to rotate either by means of a silent chain which is becoming the accepted form for this style of transmission, or by a vertical shaft driven by bevel gearing from the crankshaft. The shaft carries a series of cams J, and a wormwheel G. The operation of the cams is conventional and needs no explanation. The gear G meshes with the gearwheel G1 attached to the extremity of the shaft F, which at its other extremity carries a bevel gear. This meshes with another gear E attached to the rotary valve B. The spindle of the poppet valve A passes through the hollow spindle of the rotary valve in the manner shown.

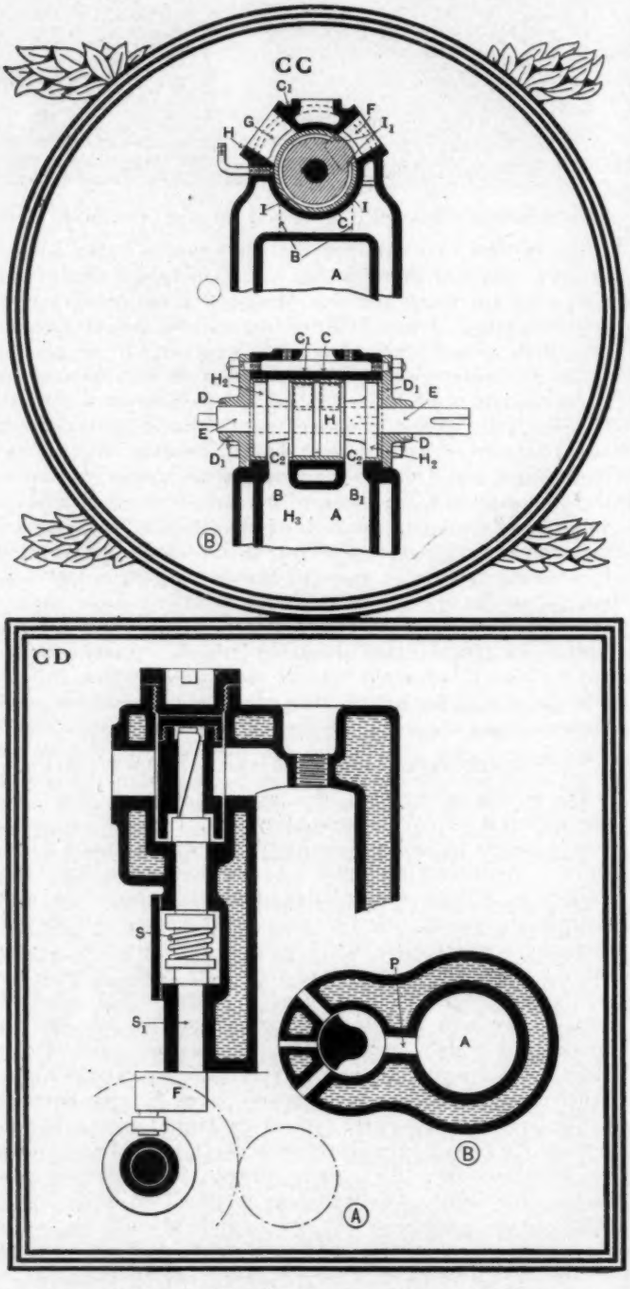


Fig. CC—Sectional views through the Martin Motor, showing the construction of the rotary valve

Fig. CD—Sectional transverse and plan views of a motor, with an oscillating shuttle cam valve

Rotary Disc Valve of the Blood Motor

This type of motor, shown in Fig. CJ, was described recently in THE AUTOMOBILE and consists of a rotary disc valve with a port cut therein which is caused to register with the intake and exhaust passageways, being operated by means of three sets of bevel gearing. The shape of the motor casting is clearly shown in the longitudinal section of the motor, which is of the single-cylinder, four-cycle type.

Hewitt Controls Tandem Cylinders by Piston Valves

This invention relates to the method of working tandem differential-cylinder, internal-combustion engine, which consists in cutting off the supply of mixture to either cylinder independently, or to both cylinders, and simultaneously opening such cylinder or cylinders to the atmosphere, so that three different powers can be obtained. The point of interest in valveless motors consists in the methods by which a tandem engine is controlled by piston valves working in cylinders open at their ends to the two engine cylinders. Fig. CI is a transverse sec-

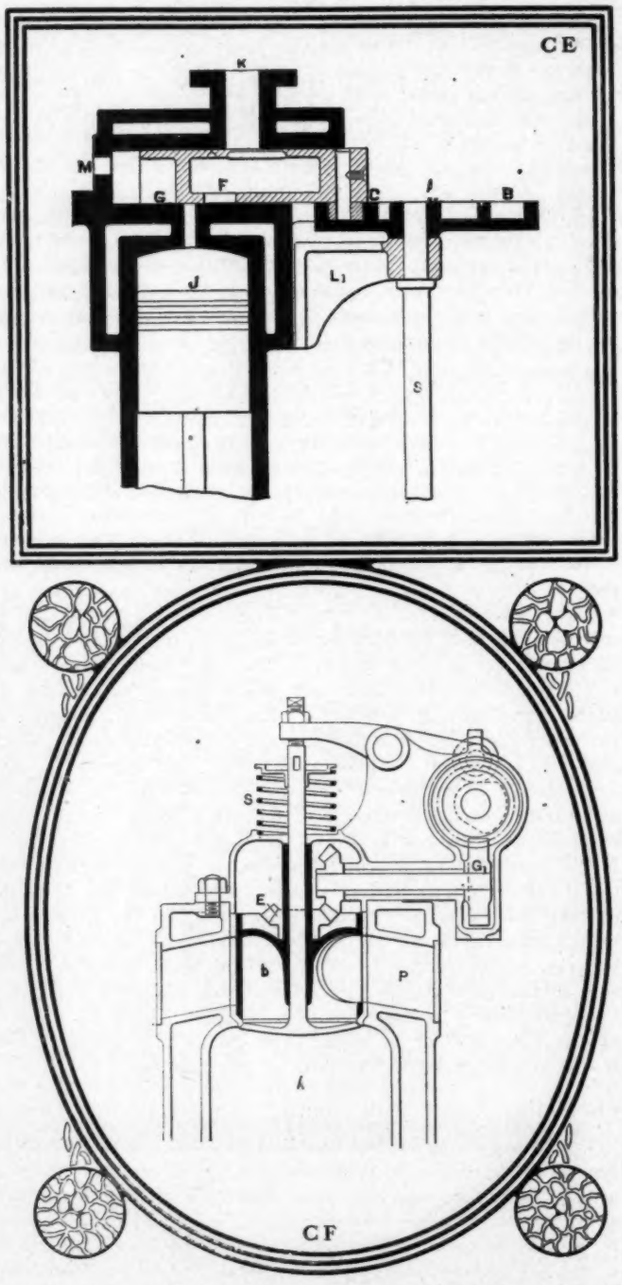
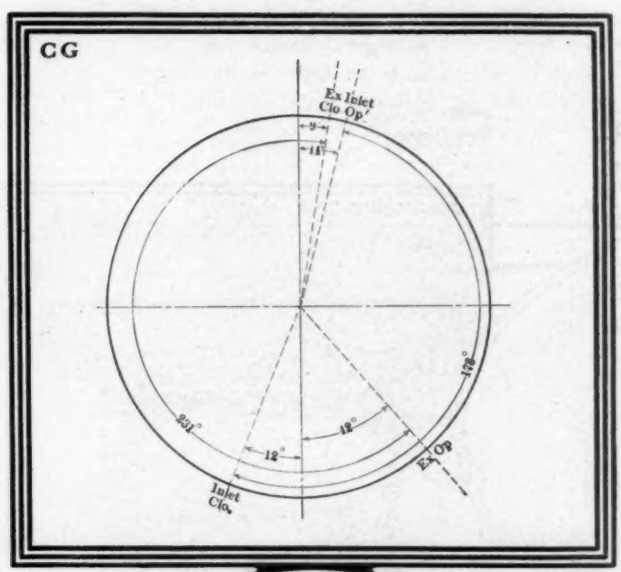


Fig. CE—Ward motor, showing the method of operating the slide valve in the cylinder head

Fig. CF—Combination of poppet and a rotary valve employed in the McLeod motor

tion through the induction valve of the motor; the two cylinders A and B are arranged one above the other in tandem form, the lower one being of larger diameter than the upper. The piston C is continued down and carries the lower piston B. The valves are double-ended pistons, are driven at half-speed from the crankshaft. They are set to uncover the ports alternately at either end of the piston valve, so that openings and closings to one cylinder are repeated half a revolution of the valve crank afterwards in the other cylinder. Each cylinder has induction ports E and F, which open separately into the induction pipe G, forming valve ports H and G. A sleeve K, rotating within the induction pipe G, has a port L registering with the ports H and J in the induction pipe. The two air or relief valves M and N have springs which are strong enough to resist the suction during the induction stroke, and their stems terminate to meet the cams O on the shaft P, these cams being so arranged that either or both valves can be opened, thus nullifying either or both cylinders. The sleeve K and the shaft P. are connected to a lever under the control of the driver.



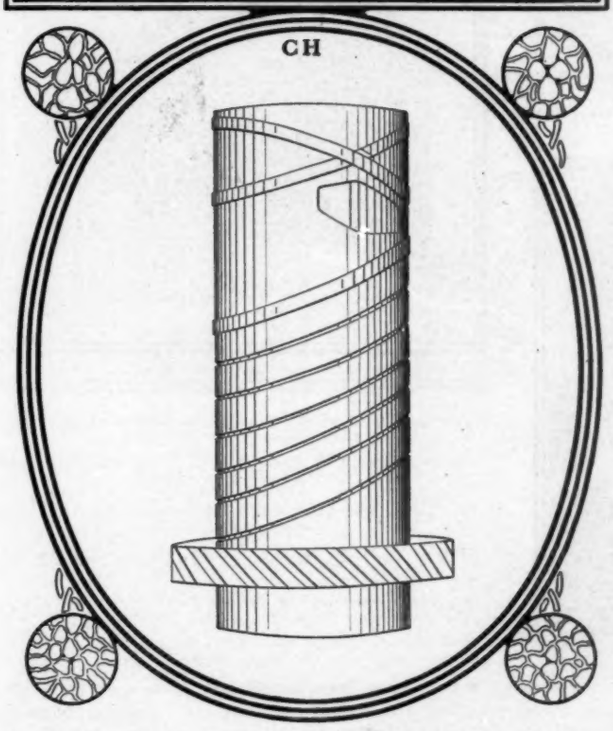
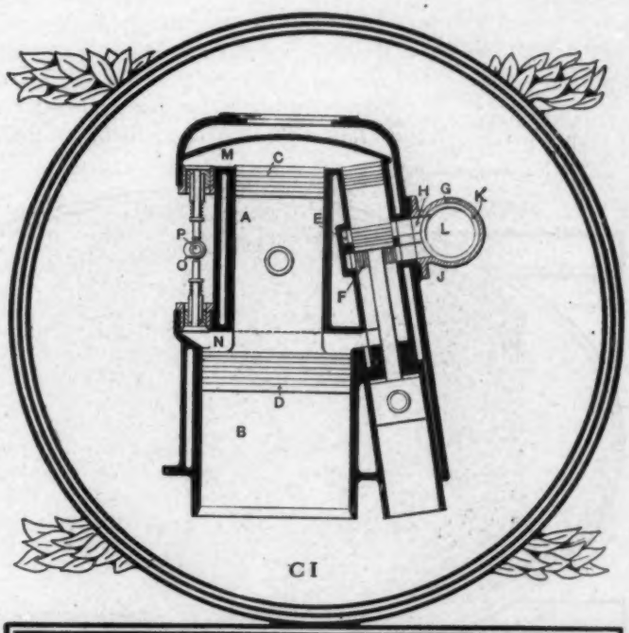


Fig. CG—Diagram of the timing obtained with the combination employed in the McLeod motor

Fig. CH—Appearance of the sleeve used in the Clegg motor, showing the elliptical expansion rings

Clegg Uses Elliptical Rings with Rotary Sleeve

The sleeve shown in Fig. CH is one from a motor designed by W. H. Clegg. The feature of this construction lies in the manner in which the rings are cut and fitted; these are elliptical in shape. By making a simple attachment to an ordinary lathe, there is no difficulty in cutting the grooves in the sleeve or turning the piston rings in the manner shown. The idea of the inclined ring is to prevent uneven wear, and each ring comes into contact with a far larger surface of the cylinder wall than would be the case with the ordinary type of ring. It will be noticed that the grooves in the cylinder are cut elliptically.



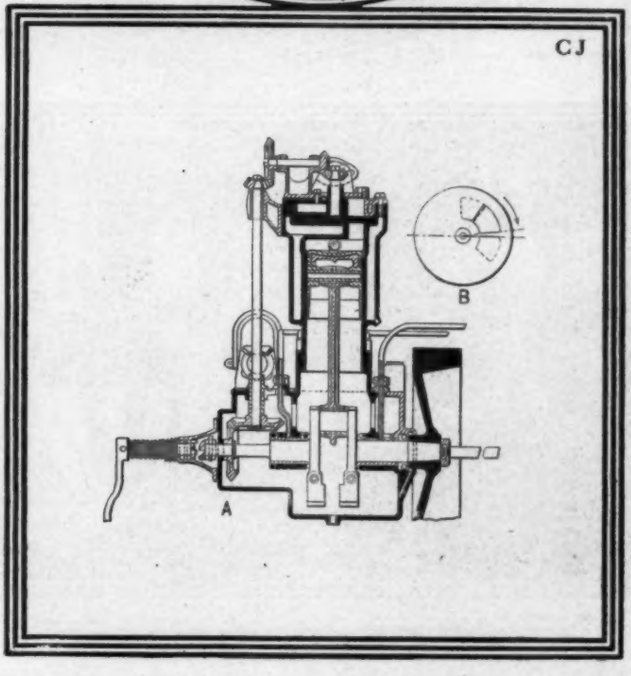


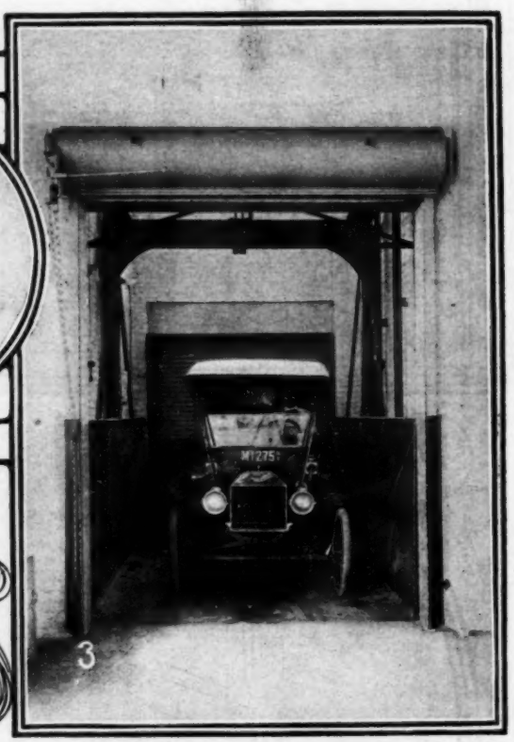
Fig. CI—Section through the intake valve of the Hewitt motor, in which tandem cylinders are employed

Fig. CJ—Section through the Blood rotary disc-valve motor, showing method of operating the discs

More Service for Ford Owners

Long Island Building Open for Work

Complete plant of the Ford Motor Company, dedicated to keeping the cars owned in territory contiguous and adjacent to New York in running order, has been finished and already a large force of men is employed in all departments. There is much room for expansion, and the present big building could be run up ten stories on the existing foundation if the necessities should require.



1—The new Ford service building at Honeywell street and Jackson avenue, Astoria, L. I.

2—The main offices located on the second floor are large and commodious

3—Elevator connecting the various floors and one of the inlets from the railroad landing

TEN thousand owners of Ford automobiles living in New York, New Jersey and Connecticut will be interested in learning that the magnificent new service department of that company practically has been completed and is prepared now to take up its work for them.

Good service is now regarded as one of the most important advantages to offer a prospective buyer and almost without exception the makers of automobiles have recognized the fact in some degree. The expression of this phase of marketing automobiles in New York takes various shapes and forms, the highest examples of which are shown in the new buildings of the Packard Motor Car Company, the Ford Motor Company, the White Company, Pierce-Arrow and several others.

Millions of dollars have been invested in these enterprises and only a real good start has been made so far. Judging from the past and present, the future holds out the certainty of numerous similar installations.

Service in its applied sense means keeping the car on the road. No matter how much a car may have cost it is worthless unless it will run, and the value of the "service department" is measured exactly by the amount it serves in time and expense in keeping the car running at high efficiency.

The Ford company has had a service department connected with its New York branch house for years, just as most of the selling companies in New York are equipped, and the new building simply means an attempt to furnish more and better service.

The lot, which is 250 by 265 feet, was purchased about two years ago and the building was commenced in March, 1910. The lot faces on Jackson avenue and Honeywell street, just where Astoria and Long Island City come together. Jackson avenue is the main artery of travel from the Queensboro bridge, and Honeywell street is only about half a mile from its eastern end.

Plenty of Room for Expansion

The present building occupies only a part of the lot and its construction has been accomplished with the idea of future additions. For instance, the walls are much thicker and more substantial than would be required for a building three stories high, and the roof as it stands to-day could be converted into another floor at small expense.

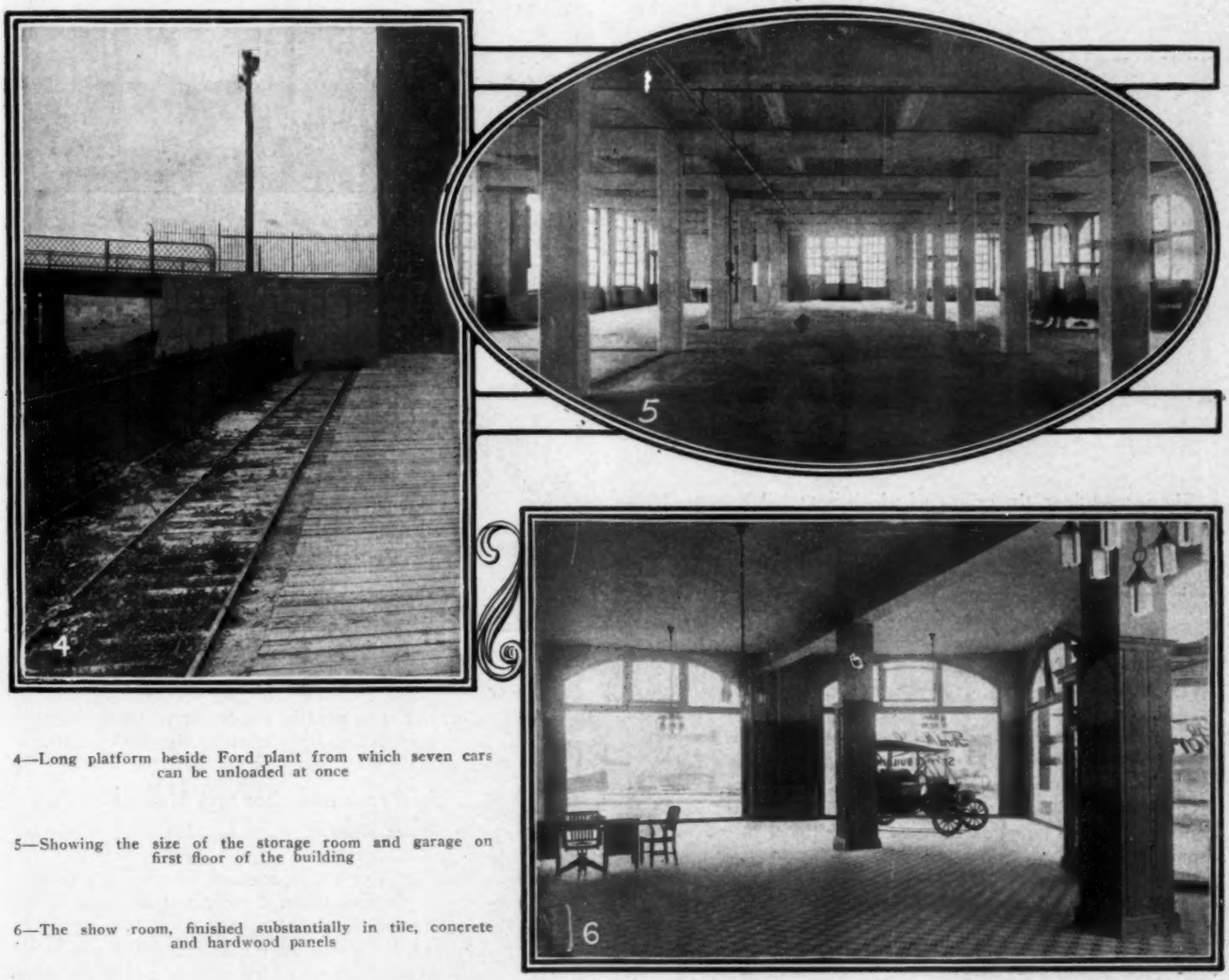
The present building measures 75 feet in width by 223 feet on Honeywell street and 195 feet on the inside of the lot.

Its foundations are of rock and concrete and its walls 2 feet thick. The sub-basement, floored with concrete cement, is all thrown together in one vast room which is used for storage of completed cars. The ceiling of the basement is 12 feet 9 inches high and is connected with the outside and the other floors by a giant electric elevator. At the back end of the basement is the boiler room, which is separated from the rest of the structure by fire walls and is so isolated that one cannot reach it unless by going outside the building and entering from the rear.

Twenty massive pillars of reinforced concrete extend in double rank through the building longitudinally and are carried from sub-basement to roof. There is storage room for 300 cars in this part of the plant. The floor space of each of the four floors is 15,800 square feet or a total of 63,200 square feet in the four floors.

The main floor is divided into two parts, the front being cut off from the main room by a bulkhead at the second file of pillars. The interior of this room has been fitted up with massive but severely plain furnishings and decorations. The pillars are paneled with oak and the floor is tiled with enameled material. The front and both sides are occupied with wide show windows and the room will be used as a display place. The ceiling is 15 feet 9 inches high.

Back of the bulkhead is the garage, another giant room extending to the rear line of the building, rectangular and measuring 175 by 75 feet. At the side entrance of the building is stationed the timekeeper of the plant and the man responsible for the comings and goings of men and material.



4—Long platform beside Ford plant from which seven cars can be unloaded at once

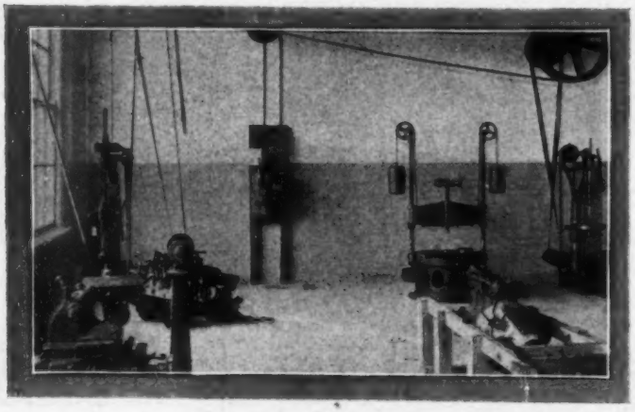
5—Showing the size of the storage room and garage on first floor of the building

6—The show room, finished substantially in tile, concrete and hardwood panels

How the Spare Parts Are Carried

Ample room is afforded for over 200 cars on what would correspond to "live storage" in the ordinary garage. Like each of the other floors, this one has connection of course with the elevator, and at the rear of the building a spur of the Pennsylvania Railroad reaches across the whole structure and along a substantial freight platform so that seven cars can be loaded or unloaded at the same time. A door at the left side of the building also affords an inlet into the main building from the platform. The same may be said for a door through the center of the rear wall.

7—Where the actual work is done; the first table is for body repairs; second and third, engine assembly, and others, transmissions, axles, etc.



8—Machine tools with which the Ford service plant is equipped

The second floor, the ceiling of which is 14 feet 6 inches high, is one of the most interesting and important factors of the plant. In front and corresponding in size to the showroom on the ground floor is the office where fifteen persons are employed with records, correspondence and accounts. Back of the cross-bulkhead is the parts storage department. At the left side of the room is a series of adjustable bins of various sizes, all opening upon small aisles. These bins are numbered to correspond with the catalogue parts of the Ford automobile and there is one for each screw and washer, spring clip and block of cylinders, side member and ignition system as well as every other part contained in the automobile.

The card contains a statement of how many of the pieces have been placed in the bin and when any are withdrawn in filling orders, the fact is noted on the card before the clerk moves away from the bin.

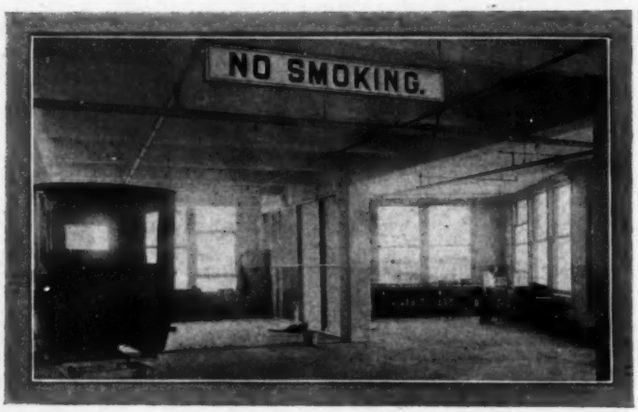
There is a plain warning in each bin as to the minimum number of parts of the particular kind that it should always contain and when the stock has been reduced to that minimum level orders for replenishment are given. When a part is withdrawn, the clerk not only notes that fact, but he subtracts the number of parts he is taking from the number contained in the bin, showing the exact state of the stock at a glance.

An exact check can be thus kept on stock by comparing the original orders with the cards at stated periods.

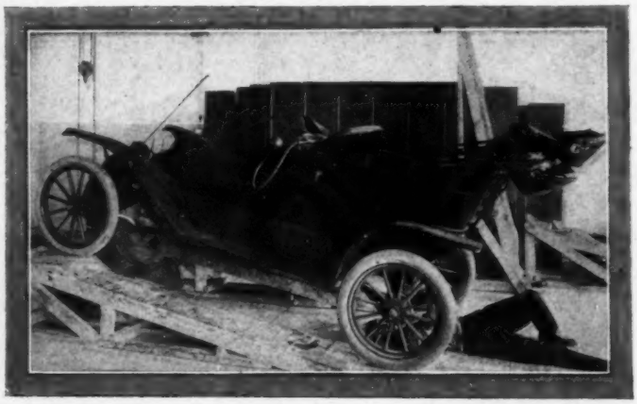
There are thousands of these bins in this department, but very many of them contain the complete parts of former models. In fact, parts for the six-cylinder car made by the company several years ago are given considerable space although, of course, the emphasis is laid on the current model. In the bins there are parts for the assembly of fifty complete cars, from top to tires and from taillight to radiator.

The system of handling repairs is not widely different from that in use in other well-equipped plants. The car needing repairs is brought in and inspected. Then the foreman issues an order on the storekeeper for certain parts by number. A copy of this order is kept by the foreman, the original goes to the superintendent and the triplicate is transmitted to the stockroom. The order is filled from the bins and a receipt is taken by the stockkeeper from the foreman.

The records of the superintendent are used as the basis of billing the work, and on a particular job the foreman's order



9—Where the body work is done; a dust-proof varnishing room partly finished is shown at the left



10—Runners used to elevate the front of a car make forward repair work easier

for parts, his bill for time used in his department and other expense bills are assembled under one charge number in the accounting department.

Keeping Track of Labor and Material

In the stockroom are complete parts for all models subsequent to 1904.

On the top floor is the repair department, painting and varnishing department and the department devoted to body work.

The body department is located in front and the repair department in the main division of the floor. In the body department, which is also equipped with a complete plant for painting and structural repairs, is a dust-proof varnishing room. This feature is not quite finished at present but will be in the course of a short time. The idea is to partition off space sufficient to handle two automobiles and by making the walls and interior partition dustproof with heavily woven cloth covering, to furnish a place where the final touches of body decoration will not be damaged by dust sticking to the drying varnish.

A fire door affords entrance to the repair department proper, which is one long room, 175 by 75 feet. On the left after passing the fire door is the place where the automobiles in various stages of repair are quartered. They stand along in a row from one end of the room to the other and at the time of the visit of a representative of THE AUTOMOBILE there were probably a

score of cars on the floor. The system of handling repairs is very simple. After the work is laid out and the exact character of the repairs to be made is established the car is dismantled as far as is necessary and the body is given a space in the row.

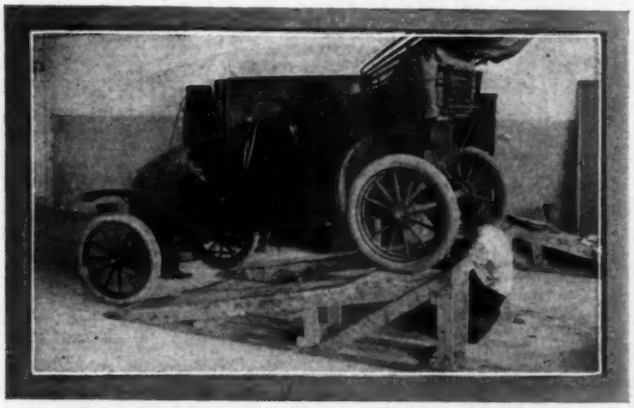
Equipment Seems to Include Everything

If there is to be some structural repair of the body, the damaged parts are removed to the first group of tables on the right side of the floor where vises and woodworking tools are arranged and where several men may work at once. If the motor is to be overhauled and repaired, it goes to the second group of tables and the transmissions are assigned to the third.

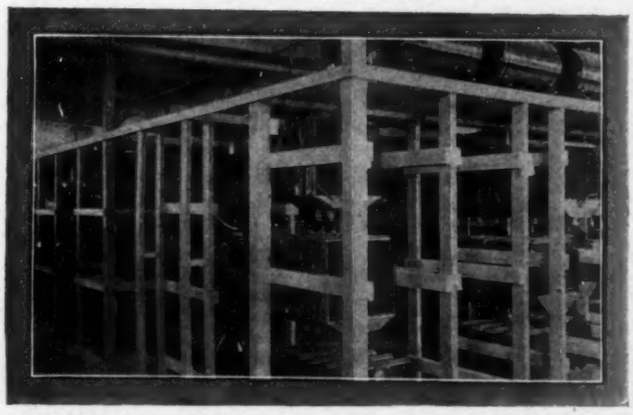
Just after passing the fire door there is a screened room at the right in which the power-driven machine tools are installed. These consist of lathes, drills, press, buffing and grinding tools, shaping and milling tools and constitute a battery of sufficient scope to handle any ordinary work.

There are many little refinements of action in the work performed at the Ford plant. One little device, the invention of the foreman of the repair department, is a pair of inclined runners upon which the car may be placed in such a way as to avoid the necessity of working in very close quarters. The runners raise first the front end of the car and then the rear and by using them access to the axles is made comparatively easy.

The building is as nearly fireproof as any similar building can



11—When the car is reversed it gives plenty of room to work under rear axle



12—Some of the racks containing Ford parts, ready for any kind of a demand

be. Aside from a small amount of paneling and an occasional board here and there for a variety of purposes there is nothing combustible in the plant except the gasoline, oil and the cars themselves. In order to prevent fire danger the building is also equipped with a detailed system of sprinklers with fusible plugs that melt at a low temperature, thus insuring a deluge of water upon any point from which much heat radiates.

There is no big power plant in the Ford Service Building, the boilers and engine room referred to before being an auxiliary. The power plant is represented by a heavy feed wire, over which passes the electric force from the public station.

The sanitary accessories of the building are most complete and ample. Shower baths, comfort rooms and lavatories are distributed through the building.

Railroad Facilities Are Ample

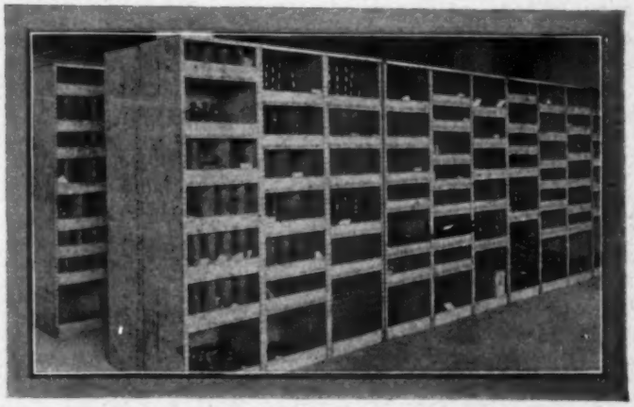
Directly in the rear of the building is the spur track of the Pennsylvania Railroad and back of this switch are the main lines of the Long Island Railroad, all of which simplifies the problem of freight transportation.

It is the intention of the company to maintain a stock of cars at the plant which may be drawn upon in emergencies by dealers, but from the physical characteristics of the building as it stands there appears to be a vastly more significant future outlined.

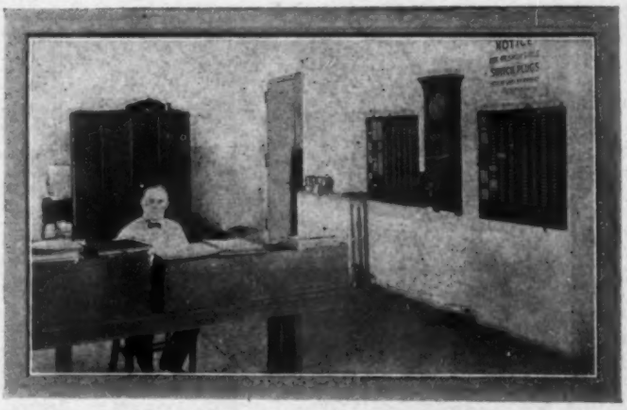
As has been said, the present building can be increased to ten stories on its existing walls and foundations and the fact that only about one-third of the lot is occupied by the building makes future expansion among the probabilities.

If it is in the minds of the company to establish a vast assembling plant on Long Island to supply not only the contiguous territory but also the export requirements, the real estate and building now there would form a substantial nucleus for such an undertaking.

However, at present such a development seems far in the future and the immense building with all its modern fittings will be used to better Ford service. At this stage of progress the plant employs fifteen persons in the offices and seventy in the shop and repair departments. In the immediate future the latter item will be increased to 100 men and if the full capacity of the plant was filled the payroll of the shop force would contain at least 125 names. There are about a score working in the stockroom and a dozen are employed as floormen or demonstrators.



13—Every part, nut and bolt going into the Ford cars is carefully listed and binned as shown here



14—An important part of any commercial enterprise is keeping track of what comes in and goes out

Letters Answered and Discussed

Dressing for Mohair Tops

EDITOR THE AUTOMOBILE:

[2,805]—Would you be kind enough to tell me if you know of any kind of dressing for mohair tops? I would esteem it a favor if you would give this your attention at an early date. F. R. FRIBLEY.

Bourbon, Ind.

Manufacturers of mohair goods and others acquainted with their wearing qualities, etc., advise the use of plain soap and water as a medium for keeping the mohair top in proper condition.

When the top becomes dirty and takes on a "frowzy" appearance brush very briskly with a stiff broom, or wash thoroughly with a solution of castile soap and soft water. Apply the solution with a wool sponge and dry off thoroughly. This is said to be the only safe method of treating a double-texture mohair top with a rubber interlining. The application of oil of any kind, of gasoline or any cleaning preparation is very detrimental to the rubber interlining.

Plain soap and water and the whisk broom are the reliable cleaning and preserving mediums of all mohair fabrics.

Marking the Flywheel

Editor THE AUTOMOBILE:

[2,806]—As I am about to take down my engine to overhaul and clean it, I wish to be sure that I get the timing correct when replacing the valve mechanism. As the engine is at present, the timing is correct, and I have no desire to make any changes in that direction. I am aware that there is a method of marking the flywheel, but do not know exactly how to go about it. Would you kindly give me directions as to how to proceed? AMATEUR.

St. Paul, Minn.

The marks placed on the flywheel indicate the upper and lower dead centers, the position of opening for both the inlet and exhaust valves and of closing for each valve. A piece of sheet brass is cut into the form shown in Fig. 3 and used as an indicator, or a mark is put on the engine base, which fulfills the same office. Chisel marks are then placed on the flywheel, and the initials of the operation indicate what is taking place when the mark registers with the indicator, as, for instance, in the illustration 1 E. O. indicates that the exhaust valve of cylinder number one has just started to open. In the case of several operations taking place at the same time, such as the exhaust for cylinders one and three, opening at the same relative position of the flywheel, the lettering would be 1-3 E. O.

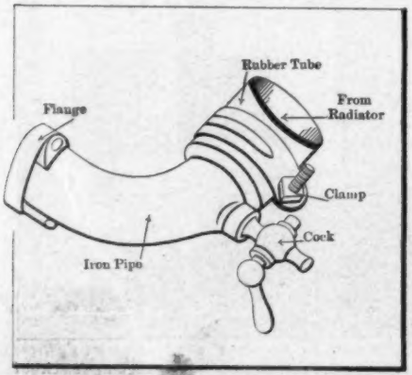


Fig. 1—Showing fitting with drain cock on radiator connection

Keep It "Right Side Up"

Editor THE AUTOMOBILE:

[2,807]—Being a subscriber to your journal, I take the liberty to make a query, which I hope to see in an early issue of THE AUTOMOBILE. Would a motor lose any power if the engine were turned upside down so that the pistons exerted their power in an upward direction instead of downward? In this case the crankcase would, of course, be above the cylinders. The lubrication is considered to be perfect. A SUBSCRIBER.

Tiffin, Ohio.

If the lubrication were taken care of the engine would run. After the engine was stopped a pool of oil would probably collect in the cylinder head. We advise running the engine right side up.

Soldering Aluminum

Editor THE AUTOMOBILE:

[2,808]—Kindly give me a receipt for soldering the aluminum base of an automobile. I would like to know where I can buy the special solder or flux necessary for this class of work. CHARLES DEAN.

Queen Anne, Md.

The soldering of aluminum has not as yet been perfected, although fairly satisfactory results have been obtained. Repairs made by the oxy-acetylene and electric welding processes, however, are highly satisfactory. A receipt which has been used to advantage in Germany is as follows: Tin, 80 per cent., and zinc, 20 per cent. The flux consists of 80 parts of stearic acid, 10 parts chloride of zinc and 10 parts of chloride of tin. A solid nickel soldering iron should be used, so as not to discolor the metal.

Fitting Drain Cock

Editor THE AUTOMOBILE:

[2,809]—There is no drain cock on the bottom of the radiator of my automobile. Would you kindly tell me how to install one in such a position that it would be possible to drain all the water off in case I wished to store the machine for any length of time? Any information you could give me on the subject would be greatly appreciated. R. S. STEWART.

Tuckahoe, N. Y.

Where the radiator is connected to a pipe by means of a rubber tube, as is usually the case, a fitting such as that shown in Fig. 1 may be purchased, which will have a boss into which a plug or a cock may be screwed, as shown in the illustration.

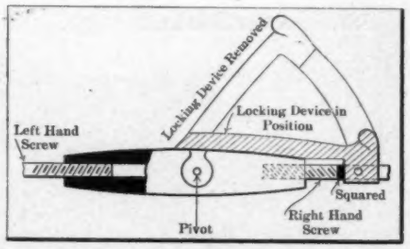


Fig. 2—Illustrating a method used by a subscriber in locking the brake adjustment

Locking Brake Adjustment

Editor THE AUTOMOBILE:

[2,810]—The sketch I am sending herewith (Fig. 2) illustrates a locking device which I have installed on the brake rod of my car. I think it is superior to the usual method of fastening by lock nuts. The lock is held in the turnbuckle by means of a pivot, about which it is free to turn. When in position, as shown, it is held by a pin which passes through the squared rod. E. F. S.

Garden City, N. Y.

Desires Names of Cars

Editor THE AUTOMOBILE:

[2,811]—Do you know of any cars being made with planetary transmission, three speeds forward and one backing speed? I would greatly appreciate the names of these cars if you would give them to me at an early date. J. W. MELTON.

Richmond, Va.

We have no list of cars using the type of transmission you describe.

Screen in Intake Line

Editor THE AUTOMOBILE:

[2,812]—I am using a very poor grade of gasoline and find great trouble in completely vaporizing it, especially at low speeds. I have been advised to put a screen in the intake manifold. Would you please tell me how it is done?

CHARLES BEECHAM.

Wellston, O.

It cannot be recommended as highly advisable to place a screen in the intake manifold. The method of inserting is shown in Fig. 4. An indentation is made in each of the two joining flanges, into which the flange which holds the screen is fitted.

An Unexpected Kick

Editor THE AUTOMOBILE:

[2,813]—After having stopped my motor for a few moments I found it necessary to start it again, so I proceeded to crank

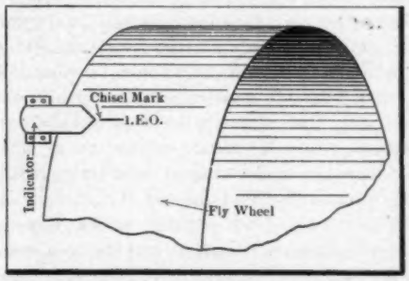


Fig. 3—Method of marking the flywheels of a motor so as to replace timing mechanism properly

it in the usual manner, when suddenly the crank was jerked from my hand and I narrowly escaped painful injury. This is the first time the motor has ever kicked back while being cranked and I would be much obliged if you could give any causes to which it may be due. J. F. S.

Greenlawn, N. Y.

The fact that the motor was cranked right after having been stopped, taken in connection with the probability that you have had experience enough to retard the spark before cranking the motor, tends to show that the cause of your trouble was an overheated cylinder. The overheating was doubtless due to carbon deposits (which may be removed by using a good decarbonizer) or to a projection in the cylinder.

Opinions of an Outsider

Editor THE AUTOMOBILE:

[2,814]—I notice a good deal of discussion in the automobile trade magazines lately in regard to "what is the matter with the automobile trade." It seems that the sales are not what they are expected to be or what they should be. A number of reasons are advanced to account for the conditions, but there are some reasons that are apparent to a person "on the outside" that I have never seen mentioned. I refer to the lack of courtesy and of selling ability in the agencies and branch houses.

It makes no difference how much a car is advertised in the magazines and newspapers if the agencies do not have men with the ability and tact to "close the deal" when the advertisements bring in the "prospect," the advertising does little good. If you will go around to almost any agency or branch and pretend you want to buy a car, you will find that the salesmen are, as a rule, young men who know considerably more about something else than they do about selling automobiles, and questions about details are generally answered evasively (through ignorance), or pertly.

If as much selling ability (to the ultimate consumer) were used in the automobile industry as is used in selling typewriters, adding machines, the cash register, and many other lines of industry, there would not be so much "what is the matter with the automobile trade" discussed in the trade papers. The market for motor vehicles has hardly been entered yet compared to what it will be when manufacturers begin to sell the public what the public needs instead of what they think the public wants, and back their product up by salesmen who can sell the goods. It seems that the extraordinary demand a few years ago gave the manufacturers and dealers an inflated opinion of themselves and they have not recovered from it yet.

Some recent articles in the various automobile trade papers prompted me to write this to give you the views of one who is not connected with the automobile trade, but is interested in the progress of the automobile.

J. H. MILLS, JR.

Fort Worth, Tex.

A Leaky Needle Valve

Editor THE AUTOMOBILE:

[2,815]—If you can give me any advice that will help me out of my difficulty I should be very grateful. My car ran very satisfactorily up to a short time ago when it suddenly became very balky on low speeds. The exhaust would emit great quantities of grey smoke and the engine would heat up greatly and then stop. If the motor was run at high speed it would smoke in the same manner and heat up but not to such a large extent as in running up a hill, for instance. I have adjusted the carbureter according to the directions of the maker but that does not seem to overcome the difficulty at all and I am sure that there must be a derangement somewhere.

JOHN EDWARDS.

Scranton, Pa.

The trouble is evidently one of too much gasoline. There might be some particle of foreign matter in the needle valve which holds the same open, or the float may leak if it is hollow. Examine the valve and grind if necessary.

Exhausts Batteries Rapidly

Editor THE AUTOMOBILE:

[2,816]—I have been greatly interested in reading about the troubles of car owners and your answers to them and would like to make an inquiry. I have a small car and for some reason my batteries are continually drained out, although two experts have gone over the wiring and say they see nothing wrong in it. I had a switch put in between the batteries and the timer so that when running on the magneto the batteries could be cut off entirely.

Last year I used about ten sets of batteries and this year have already used about six. Each set consisted of four batteries. I have been very careful not to run on the dry batteries, but have switched over to the magneto as soon as the engine is cranked. I would appreciate your opinion concerning the cause of the trouble.

H. G. VANDEVENTER

Mount Sterling, Ill.

It is very difficult to determine wiring trouble when it cannot be inspected. The indications are that there is a short circuit which might be constant or take place under certain running conditions, or the batteries may be in such a place that they chafe together causing their insulation to wear so that there is a slight contact between them after they have been used for a time. Another source of trouble may be the switch which you have inserted in the line. A switch is very apt to be connected up in such a way that current is allowed to pass through and hence cause the short circuit.

Fitting A Magneto

Editor THE AUTOMOBILE:

[2,817]—I am desirous of fitting a magneto to my car which at the present moment has only coil ignition. Would it be advisable to buy a second-hand magneto?

Chicago, Ill. A. B. S.

It is risky to buy second-hand magnetos as there is no "come back" if anything goes wrong.

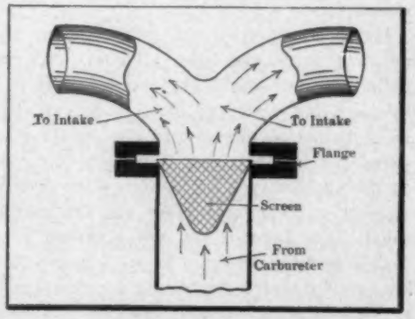


Fig. 4—Showing indentation in flanges so as to form a place for the supporting flange of the screen in the intake manifold

My 1912 Automobile

Some Conceptions of What the Ideal Car Should Be

The invitation to our subscribers to describe their ideal 1912 car has struck a popular chord. The responses show a wide appreciation of the salient points of car design and a knowledge of the points which tend to reliability and comfort. THE AUTOMOBILE *hereby continues the invitation to its readers to mail in their conception of the features which should be embodied in next year's car. The information given should include such points as:*

Horsepower	*Clutch*	*Tire sizes*	*Equipment*
Bore	*Gearset*	*Rear Axle*	*Cylinder type*
Stroke	*Drive*	*Front axle*	*No. of cylinders*
Ignition	*Springs*	*Control parts*	*Cylinders, how cast*
Lubrication	*Wheelbase*	*Body features*	*Price*
Carburetion			

In addition to giving these details the reasons for your points of selection should be stated concisely and clearly.

As a benefit in the matter of comparison some details of the average cars for 1911 are given below.

Each communication must be legibly written on one side of the paper only; it must be properly signed with the writer's full name and address, and if the writer does not wish his own name to appear in print he may request the use of any nom de plume.

Any reader desiring to make line drawings, showing details of his ideas of his car or some of its parts, is requested to do so.

Editor THE AUTOMOBILE.

DETAILS OF AVERAGE 1911 CARS WHICH WILL ENABLE READERS TO MAKE COMPARISONS IN DISCUSSING 1912 MODELS

	$1,000 *and thereabouts*	$1,500 *and thereabouts*	$2,500 *and thereabouts*	$4,000 *and thereabouts*
Horsepower	20.5	29.525	35	43.66
Bore	3.98 *inches*	4.19 *inches*	4.40 *inches*	4.875 *inches*
Stroke	4.12 *inches*	4.64 *inches*	4.98 *inches*	5.39 *inches*
Wheelbase	100 *inches*	114 *inches*	119 *inches*	124 *inches*
Front tires	31.4 x 3.3	33.1 x 3.8	35 x 4	35.7 x 4.27
Rear tires	31.4 x 3.3	33.1 x 3.8	35 x4.1	36.7 x 4.55
Number of cylinders	*Four*	*Four*	*Four*	*Four*
Cylinder type	*L-Head*	*L-Head*	*L-Head*	*T-Head*
Cylinders cast	*Pairs*	*Pairs*	*Pairs*	*Pairs*
Ignition	*Dual*	*Dual*	*Dual*	*Dual*
Clutch	*Disc*	*Multiple disc*	*Cone*	*Multiple disc*

Wants Conservative Design

EDITOR THE AUTOMOBILE:

Having driven and cared for several moderate-priced cars in the past few years, and having thereby gained some insight concerning their defects and good points, I herewith submit my idea of a car that would appeal to the owner-driver, of moderate income, and could be sold at about $1,200.

First, considering the power plant, the motor should have four cylinders, with the cylinders cast singly, if possible, or if not, in pairs, but never en bloc, as accessibility is of prime importance to the owner who cares for his own car. Another objection to the en bloc type of casting is the limited amount of bearing surface for the crankshaft. The bore of the motor should be 4 inches and the stroke 5 or 5 1-4 inches, the long-stroke motor permitting greater power at slow engine speeds, thereby reducing gear changing in congested sections and in hill climbing. There are practically no long-stroke motors used in any of the moderate-priced cars, the manufacturers evidently not wishing to assume the expense of designing new tools and fixtures to replace their regular models, in which the stroke in very few instances exceeds the bore more than 1-2 inch. The valves should all be on one side, being of slightly larger diameter than at present and given ample lift to develop the full power of the motor. Each valve spring and push rod should have an easily detachable aluminum casing of cylindrical shape, to protect valves from dust and deaden the noise.

Ignition should be by storage-battery and generator, with one of the systems of spark distributor now on the market, and this equipment would also take care of the lighting of the car and would not be any more expensive than the combined cost of the magneto, coil and gas tank. The dynamo would, of course, keep the storage battery always charged to its capacity, thereby making for long life for the battery. The motor should be water-cooled by the thermo-syphon system, the inlet and outlet manifolds being made slightly larger than at present to insure perfect circulation. The radiator should be large enough to perform what is expected of it easily. As nothing adds to or detracts from the appearance of a car so much as the style of the radiator, care should be taken to make this of as neat a design as possible, preferably square tube.

The motor should have a self-starting device, as no car is complete that obliges the operator to leave his seat to start the engine. The system by which gasoline is pumped to the cylinders and the engine started by turning on the switch offers the simplest and least expensive way to obtain this result. The motor should be fastened to the frame at three points, in such position that it is entirely under the hood, so that any cylinder may be removed or any adjustments made without interfering with the dash or body of the car.

The transmission should be by sliding gears, selectively controlled, the gearcase being mounted on the rear axle assembly, while the control levers are in the center and the steering wheel on the left-hand side. There should be three forward speeds and one reverse; the reverse should be at least as fast as the lowest forward speed. In this day of flexible motors it is easily possible to run a car backward slowly enough, even if many of the reverse speeds were double what they are at present. The reasons for the left-hand steering wheel are so obvious that I will not dwell upon them. The steering gear connections should be so made that, even if worn excessively, it will be impossible for the ball joints to drop from their sockets. The front axle should be of the I-beam type. The frame should be double-dropped, as 10-12 inches road clearance is quite sufficient, as the low center of gravity obtained by the dropped frame is particularly desirable, since it eliminates skidding to a large extent, making it practically impossible for the car to "turn turtle."

Wheels should be strongly made, with Q. D. rims, and tires 36 by 4 inches all around. Springs should be semi-elliptic in front, three-quarter elliptic in rear, with shock absorbers included in the design so proportioned as to work in harmony with the springs. By this means much could be added to the comfort of the passengers. This would be appreciated greatly, as at present most of the cars of moderate weight are notoriously rough-riding when

they are used on other than smooth roads.

The wheelbase should be about 112 inches and the body designed with a view to comfort, the backs of the seats being high enough to insure this quality. Not a few manufacturers, desiring to obtain a low, rakish, straight-line effect, have lowered the backs of the seats so that touring in these cars is always accompanied by weariness. Comfort and easy-riding qualities are almost as important as mechanical perfection, while appearance should be subordinate to both, for it is easily possible to design a good easy-riding car to look as well as some of the bone-shaking creations designed to afford a racy appearance.

In almost all five-passenger cars of 110-inch wheelbase or more the front seat is crowded close to the dash, while quite a lot of room goes to waste in the tonneau, between the rear seat and the back of the front seat. This space could be utilized to good advantage by slightly lengthening the space allotted to the front compartment. By thickening the back of the front seat slightly, a compartment could be made to accommodate the extra shoe, there being a hinged cover over this compartment. The body should have doors in front, and these doors should be readily removable.

For a moderate-weight car the semi-floating type of rear axle is quite efficient, the full-floating type not offering sufficient improvement to warrant the extra expense. The gasoline tank should be sufficiently above the carbureter to insure perfect feeding when climbing steep hills. The carburetor should be the best that money can buy. No manufacturer should equip his car with a cheap carbureter, for even the highest priced and most efficient carbureters are relatively inexpensive, and the difference in price between a good carbureter and a poor one does not atone in the slightest way for the action of the motor equipped with the latter, when compared with how it would act when equipped with the former. No motor is better than its carbureter.

The weight of such a car as I have described ought not to exceed 2,800 pounds, and by liberally using vanadium steel and aluminum fittings where possible, could probably be kept down close to 2,600 pounds. All exposed bright parts, including all lamps, wind-shield, etc., should be enameled. The owner-driver who cares for his own car does not want to spend half his time polishing brass.

There should be no traps of any kind on the running boards, but a compartment having doors should be built integral with the back of the rear seat. In this compartment would be places for luggage, shelves for tools (each tool having its individual place) and room for storage battery, thus permitting the entire space under the front seat to be used for gasoline tank.

In summing up, the main points for improvement are longer stroke motors, more accessible motors; easier-riding cars, secured by larger wheels, and properly designed springs and shock absorbers rather than excessive weight; more comfortable seats; more room for driver; higher grade carbureters; self-starting devices, and compartments to carry all accessories, thus eliminating all traps from the running boards. In conclusion I would state that all manufacturers should design their own tops and windshields to especially conform to the particular model, and always fix their price to include same in equipment of car.

A. H. SILVER.

Red Lion, Del.

Idea of Popular All-Around Car

Editor THE AUTOMOBILE:

In your issue of the 24th inst. you invite contributions from your readers as to their conception of what the 1912 car should be. I am only a car owner who drives his own car, but I have been a student of the automobile industry from the beginning, and I believe the description I give below is of a car that would prove universally popular and would give excellent service under practically all road conditions.

The motor should be six-cylinder, 4-inch bore and 6-inch stroke, cast in pairs, with open water jackets and bolted together, giving an en bloc effect, but giving the benefit of separate castings; cylinders should be T-heads, all valves enclosed; flywheel and fan combined; the pumps and magneto should be mounted on a cross-shaft at the front of the engine, allowing ample room to get to crankshafts through side plates on crankcase. Engine base and case should be cast with web so as to abolish the mud pan. The engine bearings should be four in number and of large ball-bearing type. The engine thus described will be practically 40 horsepower under S.A.E. rating, but would no doubt really develop 50 horsepower under brake test, and would be amply powerful.

The ignition should be double. There is really no virtue in dual ignition. If the magneto is all right the car can be cranked on the magneto; if the magneto should have something wrong with breaker box mechanism the battery is also out of use. The oiling system should be crankcase circulating, with sight feed on dash and with a glass float gauge on crankcase.

The carbureter should be constructed so as to have a gasoline adjustment on the dash. The clutch should be multiple-disc with not less than 51 discs, and run in oil.

The gearset should be carried amidships, or might be installed as a unit with the clutch, or the fan might be of the coventional type, but shaft-driven, and the engine, clutch and gearset installed as a unit. The gearset should be four-speed, direct on third.

Springs, semi-elliptic in front, 2 x 40; rear three-quarter elliptic, and 2 1-2 x 45 inches.

Shaft-drive with two universal joints and tension rod, should be nearly straight-line drive.

Wheel base, 116 inches, which will give ample room in body for a four-passenger car. The frame should be pressed steel, double drop and inswept at front to permit of turning in the average street.

The steering should be of the irreversible type, with large steering wheel; connections all above front axle. The radiator should be of real honeycomb type and should be hung from trunnions on the side frames.

Tire sizes should be 36 x 5 all around, and should be on demountable quick-detachable rims.

Front axle should be drop-forged I-beam with integral spring perches; the rear axle should be full floating and wheels bolted to brake drums.

Spark and throttle control should be on top of steering wheel, and both moved upwards for advance. Also should be foot accelerator. Should be double brakes on large drum 17 x 2-1-2, internal and external, both equalized; foot pedal for service brake, with cam arrangement so that farther depression will apply emergency brake also, thus doing away with emergency lever. A patent has been allowed on a practically automatic gear-shifting arrangement that is destined to revolutionize gear shifting on pleasure cars. This will do away with the side shifting lever, transferring its duties to the automatic arrangement, allowing the steering wheel to be continued on the right side of car and allowing free entry from both sides of the car. The clutch pedal to be the left-hand pedal, which follows the almost universal practice.

This car should be built to weigh not exceeding 2,600 pounds. The body should be of fore-door type, with ventilators, front seats divided purposely to prevent more than two persons on the front seat. A pocket could be inserted in the division between the seats and every advantage taken to have the car convenient and comfortable. The upholstering should be the smooth finish because it lasts twice as long as tufted, though not quite so comfortable.

Equipment should be absolutely complete, self-starter, electric lights, top, top boot, windshield, hand horn, cut-out, license hangers, robe and foot rails, magneto, shock absorbers, bumper, tools, some form of inflating tires, speedometer, demountable Q. D. rims, one extra rim, tire hangers and trunk rack.

If one of the reputable manufacturers would undertake to put this car out with a guarantee for life of car, in my opinion they could make a handsome profit at a price of $2,500 and would get orders for the entire output within sixty days from their announcement, but it would be folly for any of the newer and less known manufacturers to undertake its production.

ROBT. N. HUGHS.

Atlanta, Ga.

Little Bits of Motor Wisdom

Pertinent Pointers for Repairman and Driver

A series of short stories that will tend to keep the automobilist in touch with matters mechanical and otherwise, covering a field of information that although usually well tilled, needs frequent and careful cultivation to produce the greatest results.

WHEN USING ROLLER BEARINGS—In the effort to get away from sliding contact and its consequent loss of energy in friction one of the modern methods which has found favor is the use of roller bearings. Instead of the metal sliding over a plain metallic face it rolls over a series of small steel cylinders which are arranged as shown in Fig. 1. They are free to turn about their own axis so that the amount of bearing surface is very much reduced, being resolved down to a series of lines. The rollers are of course kept out of contact with each other as, if allowed to touch, their tendency would be to turn each other in opposite directions instead of in the same direction as they would do if performing their ordinary function.

An interesting feature about this type of bearing is the fact that the bearing surface instead of being a plane as is usual in any sort of bearing, consists instead, of a series of lines which are capable of taking a large amount of weight. The roller bearing has met with great success where used upon long axle bearings, where great weight has to be supported. In this case the great reduction in friction is very evident as the line contact has great advantages over surface contact under these conditions. Lubrication is well contained in these bearings and hence it is comparatively easy to keep them in good condition. The friction in a bearing depends to a large extent upon the surface exposed. This fact is brought out well in the observation of a wagon in comparison with a drag sledge. The wagon is much more easily drawn than the sledge because it is supported at two or four points while the sledge has a considerable area which slides upon the ground. Where there is a very large weight to be born, as at the wrist pin of the engine which receives the whole force of the explosion in the cylinder as it is transferred through the piston, the plain bearing is the safest to use. The frictional losses in the wrist pin do not amount to much however as the contact is merely oscillating, and since it is impossible to get such an adjustment where there is no lost motion whatsoever at this point the bearing surface is theoretically the line of contact between two cylinders, *i. e.*, the wrist pin and the bearing bushing.

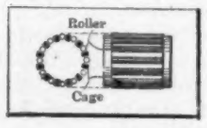


Fig. 1—Showing a roller bearing with the rollers and cage indicated.

HOSE CONNECTIONS OFTEN CARELESS—It is, on the whole, rather unsatisfactory to join the water manifold to the radiator carelessly. It is necessary that the joint be carefully made and is absolutely tight. A small leak in the joint will be responsible for the loss of much of the cooling water and since a new supply is not always available, overheating of the engine may result owing to the lack of a sufficient quantity of water in the system. Temporary repairs can be instituted, but when made, should be followed up as soon as possible by a repair which will hold. The method of clamping is illustrated in Figs. 2 and 3 in which either a semi-circular or a circular metal band is placed about the tube and a clamp bolt put in the position shown.

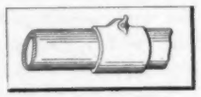


Fig. 2—Type of clamp joint used to advantage in pipe fitting

Fig. 3—Showing the winged nut on a clamp joint. This is a handy means of connecting the radiator and tubing.

ALMOST UNBELIEVABLE REPAIRS CAN NOW BE MADE—With the great advances in the knowledge of the oxy-acetylene welding processes the parts that were often thrown away or relegated to the junk pile or scrap heap can often be repaired. This knowledge will save the automobile owner who has been wont to purchase a new casting whenever cracked or broken parts have given trouble. In case of a break, the principal thing to remember is to save the parts, it will save expense.

In the case of a cracked water jacket the crack is first laid open by a partial heating until the full extent of the damage is determined. In case of a very thin crack which will not open up to any extent even under the influence of heat, it is necessary to chisel the opening so that the metal from the melt bar can be run into the crack thoroughly and fill it up solidly.

The oxy-acetylene process leads all others in use for repair work where all sorts of odd jobs are encountered. It is easily carried to different parts of the repair shop and may be controlled readily by the operator, by means of the cocks on the handle. The oxygen and acetylene gas are supplied in cylinders which are renewed when empty, the tubes are attached to these tanks and the gauges are also placed on the line near them. The oxygen is taken from the tank at about 25 pounds to the square inch while the acetylene has a pressure of six to eight pounds. The part to be treated is placed in a charcoal fire and heated up to a dull red heat. This is especially necessary in the case of cast iron as it is very liable to crack after or during the operation if this precaution is not taken, owing to the unequal expansion of the metal.

After the heating has been carried out the burner is taken and the acetylene gas turned on alone, after which the oxygen is turned on until the required flame is given. The flame will vary with the nozzle which is being used. This nozzle is adapted to the work in hand, and it is one of the characteristics of an experienced man in the art of welding to be able to choose the proper tip. The flame is directed around the gap in the metal until it runs, whereupon the melt bar is placed into the aperture and allowed to melt in with the other metal until they are joined so that they become one. When welding the gray iron used in cast cylinders a flux powder of alkaline tendencies is used to bring all the impurities to the surface, so that a strong joint is made, which would not be the case where the weld was filled with impure material.

Different metals require different treatment; steel, for instance, should be hammered on cooling and then, if possible, annealed. A steel which is high in carbon will suffer in the welding process. When welding two metals of different natures together it is necessary that the melting points be within fairly good range of each other in order to get good results.

Fig. 4—Illustrating an internal expanding brake with the relative positions of the pivot and spring shown.

INTERNAL EXPANDING BRAKES—The internal brakes are of the expanding type, that is, they are forced against the brake drum by expanding the circle which is bound by the shoes. The brakes are called internal from the fact that they bear against the inside of the brake drum and are so enclosed that grit and dirt cannot readily enter. The expansion is effected by a cam as shown in Fig. 4, which illustrates a brake of this type. When the cam is turned the shoes are spread apart by swinging about the pivot indicated in the figure just mentioned. An important part of the device is the spring which is shown in position; it is installed so that when the pressure on the pedal is released and the cam returns to its original position the brake shoes will not continue to bear against the drum, but will be pulled back to their normal state. A stop is placed so that the shoes cannot go back so far that there will be any lost motion in applying the brake pedal, or, in other words, that the brake shoes will bear against the drum as soon as the pedal is pushed down a very slight amount.

The greatest cause for rapid wear in a brake is the entrance of some gritty material between the shoe and the drum which will cause the brake to heat to such an extent that it will "burn out" leaving the material in a condition which greatly tends to rapid wear. This is an accident which is much more apt to occur in an external brake than in an internal as it is not so easy to cover them properly, but if the external and internal brakes act upon the same drum, if the drum becomes overheated from either shoe it will naturally affect both brakes.

CORRECT VALVE TIMING—In a four-cycle motor of any type or number of cylinders the exhaust valve should be opened long enough before the end of the stroke to allow the pressure to have dropped to about atmospheric before the piston has traveled any great distance on the succeeding upstroke. The exhaust valve should remain open as long as possible, not closing at any rate until the end of the exhaust stroke and generally after the flywheel has traversed about five degrees past the upper dead center. The inlet valve should not open until after the exhaust valve has closed and should remain open for the whole suction stroke so that the full weight or charge is drawn into the cylinder.

The timing of the valves depends to a large extent upon the speed of the gases on entering and leaving the cylinder. This speed is, for a given pressure, determined by the size of the port and the lift of the valve, so that for a relatively small port and slight lift the valve will have to open early and close late. Another factor in determining the timing of the valves besides the area of the ports and the lift of the valves, in relation to the volume of the cylinder, is the speed of rotation of the motor. In automobile motors which are generally of the high speed four-cycle type it is very usual to have the exhaust valve open forty degrees before the completion of the impulse stroke. This corresponds to about 7 inches on the flywheel in the case of a flywheel 2 feet in diameter, or, in any case, it will be one-ninth of the circumference. When the exhaust valve is opened as early as this it is not closed until relatively very late, that is, at about five degrees past upper dead center or occasionally as much as ten degrees. Five degrees would correspond to seven-eighths of an inch on the 2-foot wheel referred to above.

It must not be supposed that when it is mentioned that a certain function has a lead of so much over dead center or a lag of another quantity that it means that any great portion of the stroke is referred to, as the angularity of the connecting rod enters into the problem, and in the case of ten degrees past dead center on the flywheel only a little over nine-thousandths of the stroke, or with forty degrees about nine one-hundredths of the stroke. It is not a very profitable undertaking as a rule for the amateur to attempt to change the timing of the valves on a new automobile as soon as it arrives from the place of purchase; it is a fact, however, that a gain in power will result from a change after the motor has been in use for a length of time and has settled down to its work. It occasionally happens that a machine which, while not mis-timed, has not been set so that the greatest power possible is being derived; in this case it is possible to accomplish a gain by a series of carefully observed trials with different valve settings. It is of great importance that these trials be run off in logical sequence.

SLOVENLY WIRING—When it is such a simple matter to hold the wiring of the motor in such a position that it will not jump all over the engine in a series of wild gyrations while traveling along a rough road, it is a great indication of either laziness or something else of similar nature on the part of the driver. A small T-shaped attachment as shown in Fig. 5 will do away to a great extent with the apparent desire on the part of the wires to jump through the hood.

Fig. 5—T-fitting which may be used to hold wires so that they will not chafe

The fitting may consist of an ordinary T-pipe joint to which has been brazed a small flange for holding purposes. The wires are passed through the lower part of the T and out through the upper branches, whence they are conducted to the cylinders to which they belong. This will do away with any possible chafing which will be very apt to exist if the wires are allowed to fly around loosely. Another result of loose wiring is that in its working about it will tend to bend to and fro at the binding posts. This will inevitably result in its fracture. The wire itself may break within the insulation and a thing of this kind is exceedingly difficult to locate as the spark will be perfect when the wiring is in some particular position while if moved slightly it will throw the ends of the wire out of contact and cut off the spark from that particular cylinder.

SIX-CYLINDER FIRING SEQUENCE—If a variance of the order of firing in the different makes of six-cylinder cars may be taken as an indication, there has not as yet been any definite law evolved in regard to this matter. The wiring of the batteries and magneto are fairly well standardized and usually takes the form of that shown in the accompanying wiring diagram, shown in Fig. 6. The most marked difference in any case so far as the wiring is concerned will be the order in which the contact maker will send a current through to the succeeding cylinders. If the cylinders are numbered as shown in the cut, it may be interesting to note the order in which some of the leading makers of six-cylinder

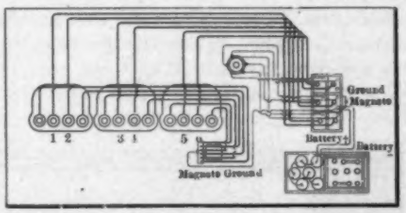


Fig. 6—Illustrating typical wiring diagram of six-cylinder motor

motors arrange their ignition. We will consider eleven makers. Of these eleven, five fired in this order: 1-4-2-6-3-5, three fired as follows: 1-5-3-6-2-4, and the others, 1-2-3-6-5-4, 1-3-2-6-4-5 and 1-3-5-6-4-2.

There are many factors which enter into the determination of the firing order, the greatest being that of getting the gas into the cylinders with as uniform distribution as possible. A manifold of a given design may give widely varying results when the firing takes place in different orders of sequence. It will be noticed that the largest percentage seems to be in favor of not allowing two succeeding cylinders to fire in succession. It is very important that the compression in each cylinder of a multi-cylinder motor should be equal, so that each crank receives the same turning moment. This is in reality much more important in most cases than the order of firing.

Cooling Troubles—Their Symptoms

Overheating Results from a Variety of Causes

The cooling system of a car should be as carefully watched as any other part of the mechanism. Trouble is not always directly due to carelessness on the part of the driver, as poor design may be the guilty factor; however, it is often the indirect result of neglect on the part of those to whom the car is turned over after leaving the hands of its makers.

STARTING with the radiator and following the cooling system through its various phases, it is seen that there are a number of causes for the overheating of the motor, any one of which may give rise to at least several of the others since they are, to a large extent, dependent upon each other. For instance, if the fan is deranged so that the water in the radiator is not cooled sufficiently, it will lead to the deposit of scale on the walls or in the cells, due to the increased activity of the chemical agents within the water under the influence of the greater heat.

There are two types of fans which are in general use, that in which the fan is formed by the vanes of the flywheel and that in which it is driven off a belt from a wheel which is actuated by a reducing gear. In the case of the former, it is necessary that there be no leakage of air past the radiator, and in order to prevent it, the air is confined by means of a tight hood. The first cause of trouble is that the air finds other and easier methods of getting through to the fan than by means of the radiator. This cuts down the cooling ability of the radiator, since it is directly dependent upon the amount of air which passes through it in a given amount of time, so that in case where this type of fans are used the air-tight hoods should be inspected. Where the second mentioned type of fan is used the greatest troubles will be in the nature of its not being driven at sufficient speed, or that it has been twisted on its bracket so that it has come out of alignment. In this case the resulting noise would soon lead to its detection. Occasionally after a belt has been used for a length of time it will stretch so that there will be a larger percentage of slip which will have to be taken up. This can be tightened by means of the adjusting device or by cutting the belt and inserting a new connection.

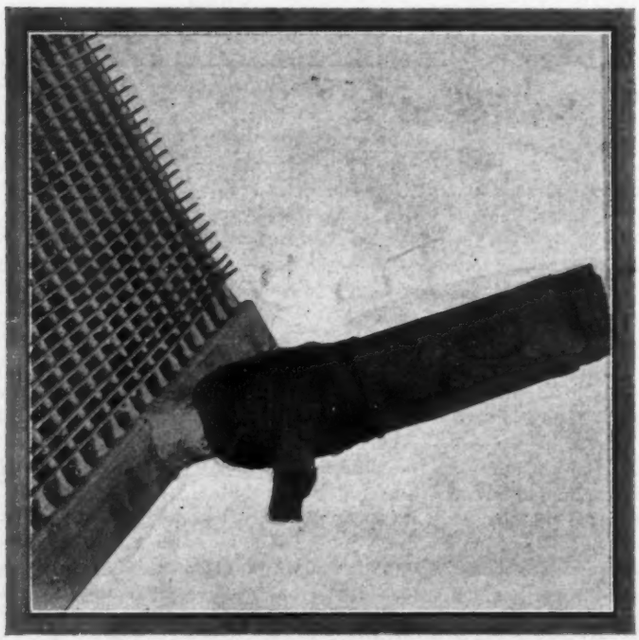


Fig. 1—Illustrating a temporary repair made on a hose connection, which, while satisfactory for a short time, should be immediately replaced by a permanent repair

Fig. 2—Method of making a tight connection between the hose and the radiator. A metal clamp is fastened in place with a small bolt

The greatest damage to the system is caused by the various kinds of obstructions which clog the tubes and interrupt the circulation. The obstructions in the radiator are generally caused by deposits due to the use of impure water, while those in the other parts of the system are caused by imperfect pipe fitting or by foreign matter in the piping. The best way to keep out of radiator trouble is to use the proverbial ounce of prevention and wash the radiator frequently, both on the inside and outside, and in case the only water procurable is known to be very rich in calcium carbonate or calcium sulphate or any of the magnesium salts, some form of scale preventative of a chemical nature may be used which will go far in preventing the formation of scale. Water which contains these salts of calcium or magnesium to any extent is commonly classed as hard and may be detected by its inability to form a lather with soap. It may be remarked right here, however, that it is exceedingly dangerous and inadvisable to experiment with the many detergents which are on the market, as their action on the metal of the radiator is highly corrosive, unless it is absolutely necessary. Ordinary care and the occasional flushing out of the radiator with a small quantity of soda will generally keep it in good condition.

When the obstruction is in the water piping it is apt to be caused by careless fitting more than from any other cause. Where there is a pipe joint in which it is necessary to maintain absolute tightness there will be a gasket inserted to hold the joint tight. It is not an uncommon accident to have this gasket squeezed into the pipe so that it will choke the bore to such a degree that the capacity will be very largely cut down. In this case overheating will be a natural result and the case will be a most puzzling one, for no amount of radiator cleaning will remedy it, and the driver is very apt to think that the trouble lies in the carbureter adjustment or some other part of the mechanism which may be in a state of perfect adjustment. It is impossible to detect the defective washer or gasket until the piping is taken apart and inspected.

In the case of a thermo-syphon system the most common fault is not due to the carelessness of the driver as a rule, but to a lack of foresight in the design. This defect is that of not allowing the water in the cooler to be a sufficient height above the point at which the water re-enters the tank after having passed through the system. The water is circulated to a great degree by the steam generated above the top of the engine

Fig. 3—Showing a cracked water jacket which will allow the cooling water to run away

cylinder at the point of outlet from the waterjacketing; the flow, however, to be satisfactory, must be continuous and this is impossible if the water falls below the tube which carries the water into the cooler so in order that the water will not drop below this level after having run for a comparatively short distance, it should be a matter which is well attended to by the designer. He should be careful that the filler opening is at a good height above the top of the cylinder.

The matter of foreign material in the piping and waterjacketing is largely due to the same causes as those which have been named for the deposits of scale in the radiator. The deposit is to a great degree lime, although there is always a large amount of other matter present. The deposit will gradually accumulate, getting worse and worse until, if not attended to, it will very seriously affect the circulation and hence impair to a great extent the cooling of the motor. A reliable remedy for this as well as for the radiator trouble is hot soda, although there are several patent solutions for sale which are no doubt very good.

The water pump is very seldom the cause of any great trouble in the way of cooling, as a centrifugal pump, which is the type in general use, is so simple that it is not very liable to get out

Fig. 4—Broken water jacket which can be welded by the oxy-acetylene process if the missing part is not lost

of order in such a way that it permanently cuts off the water supply. The packing might start to leak or the pump may not be driven fast enough, but the former is merely a matter of adjusting the stuffing gland, while the latter is not very liable to ever happen since the correct speed of the pump has been determined in its relation to the engine speed.

The matter of small or contracted piping is another feature which if it were present would seriously affect the cooling system. The piping of a motor is, as a rule, designed to be of ample size to permit the required quantity of water to pass through at the correct velocity. It may be easily seen how a contraction in any part of the piping system would change the whole scheme of flow. The velocity of the water in any part of the pipe must vary inversely with the diameter of the pipe since the same quantity of water must pass through each section in a given time. Hence, the amount of water passing through the pipe in a unit of time would be governed by the amount which passed through the smallest opening in that length of time. If the piping is constricted by an indentation of more or less severe nature the required amount of water will not be circulated through the jackets and the motor will be bound to overheat.

It is, of course, very obvious that a leak in the water system will be responsible for the overheating of the motor. In this case it is not the leak which is directly responsible but the lack of sufficient water due to its having been wasted by flowing from the pipe in which the leak is taking place. Besides being in the piping the leakage may be due to a cracked waterjacket or to a punctured radiator. In the case of the piping it is very often the case that a slight leak has been repaired by the owner in an inadequate manner. An illustration of this is given in Fig. 1, in which tape has been roughly wound about the rubber tubing at the point where the water is taken from the radiator. This repair was no doubt made upon the road and intended to hold the joint until a repair shop was reached. This is often done, the only trouble is, however, that the owner generally neglects to go to the repair shop with his car after having made the temporary repair, but thinks he will take "just one more spin" before the repair is made. Many a time has the owner of a new car, or perhaps more often the new owner of an old car, started for the repair shop with the firm, but often reluctant intention of having a few minor repairs made. The temptation gradually steals upon him to "hit her up" a little before putting the car into

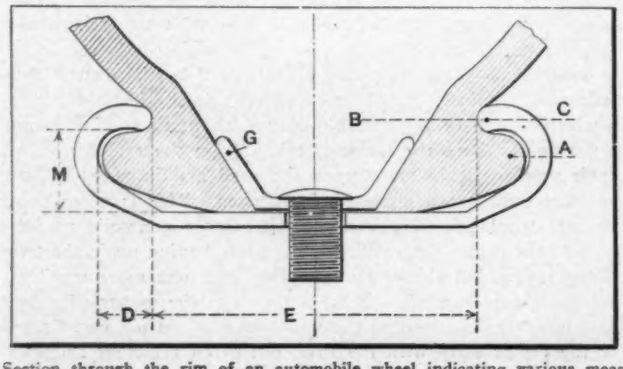
the tender hands of the repairman and, as a result, in a short time the driver finds himself far beyond the confines of the town with the motor perhaps running well and the temporary repair, to all appearances, as good as new. He may get through with it, but in a large percentage of cases he finds himself behind a two-horsepower country wagon trailing leisurely along by means of a rope. Human nature is naturally bound to assert itself, but incidents such as the above could, to a large extent, be eliminated by the installation of a few tools and a repair bench in the garage. The method of repairing a leaky hose joint is to cut off the worn end and fit a clamp as shown in Fig. 2. In case the hose cannot be cut off a new section will have to be purchased and the end fastened with the clamp as shown in the illustration just mentioned. It happens sometimes, though happily very rarely, that the lining of the rubber tubing used in this part of the system works loose and acts very much like a non-return valve in that it would allow the water to flow in the opposite direction, while it is washed across the hose by the water in its flow, thus sometimes closing the tube entirely. This is a very elusive mishap to locate and will often give a great amount of trouble, as the indications are the same as any other clogging and no one is apt to suspect the short piece of rubber pipe which, nevertheless, is at the source of the trouble.

When the water goes above the boiling point, which is about 212 degrees Fahrenheit, steam is given off which will cause trouble in many ways. The resulting expansion due to the latent heat of steam will give a pressure in the waterjacketing far above that ordinarily encountered. This will often find its way back into the pump and cause trouble. It may be detected by the steam which escapes from the radiator cap and other joints in the water system. When there is insufficient water in the system boiling will result and, as has already been stated, a deposit of lime with its accompanying evils will be the result. Another difficulty which, it may be happily stated, is not as common as it was at one time is the presence of air locks in the circulating system. This was caused by having large vertical reverse bends in the tubing or connecting pipes, and may be classed as a first cousin to that other trouble of somewhat the same nature, namely, that of kinks in the hose connections.

A note of warning often sounded but as frequently unheeded is to be careful that after cleaning a taken-down motor all the cotton waste is to be carefully removed and even the threads which are so frequently left upon a rough surface after having wiped it with waste are removed. These stray threads have the unhappy faculty of picking out the most pernicious spots in which to collect and clog small but important openings. Rags are often as bad in this respect and it is of great importance that care be exercised in removing any material of this nature to avoid unexpected trouble later on.

Water should not be left in the radiator or jacketing if the car is going to stand in a place where the water will freeze. In very cold weather it should be removed or else a good anti-freezing solution added to the water. The results of carelessness in this respect are a cracked water jacket as depicted in Fig. 3, or in severe cases a break such as shown in Fig. 4. While these breaks can be welded, they are very nasty things to handle.

The illustrations herewith are taken from photographs which were secured by the courtesy of the Haynes Automobile Co., 1715 Broadway, New York City, who extended the privileges of their repair shop.



Section through the rim of an automobile wheel indicating various measurements

Tires and Rims

Tires are the means provided of transmitting the power from the motor to the road surface, and in a large degree the pleasure derived from a day's drive depends upon the amount of trouble given by the tires.

AUTOMOBILING is nearly always exhilerating and as tires play such an important part it is a wonder owners do not pay more attention to them. There are certain things that the amateur has to be told in order that he may appreciate the service that certain parts have to perform. The weakest part of a tire is at the point where the side wall leaves the bead, and in order that the tires should give the maximum life it is necessary that they fit into the bead snugly.

The bead may be dented through running on a deflated tire or when passing over some obstacle. Passing over stone so that the bead receives a slanting blow is sufficient to cause the bead to become dented. This will unduly pinch the tire, with the result that the canvas at this point will be forced to undergo undue strain and in time give way.

Unless the tire fits the rim blowouts will not be at all unlikely. The following table shows the different dimensions of rims for various sizes of tires, and it would be well for the autoist if he has trouble with his tires to carefully measure the rims with a pair of calipers to ascertain if the dimensions are correct. It is false economy to try to fit a tire to a rim which was never intended to take it, because if the tire is too small the stretching that the tire undergoes spoils it, while on the other hand if the tire is too big for the rim it will not stay on properly. The dimensions in the table are in millimeters as it will be found, for people who are not used to working down to small fractions of an inch, that this form is simpler:

Tire Pressure.	90 lbs.	100 lbs.	120 lbs.	136 lbs.
E	51	62	67	77
D	8	9	11.5	12
M	12	15	16.5	16.5

The point E denotes the width of the rim at the lips, and it will be found that inside calipers are the best for making the measurement, or outside calipers may be turned, so to speak, inside out and used as inside calipers. The distance denoted by D may be best found by inserting a rule in the rim, and the same applies to M. One point that should be borne in mind is that although D may be correct as well as M, nevertheless it is necessary for E to be correct also, otherwise the tire will have a tendency to pull out of the rim.

THE THERMO-SYPHON SYSTEM—While it is common talk to the effect that the thermo-syphon system works by natural circulation, the fact remains that steam is generated at the hottest zone over the combustion chamber, and this steam, coming off of the surface in a slug, rushes away through the course of least resistance, and acts very much as the plunger of the pump. It has the potential force of the energy stored in it, and is perfectly capable of doing mechanical work in substantially the same way that the plunger of a pump drives water before it, or creates a depression into which water runs. In addition to the mechanical effect of the slugs of steam driven off during each power stroke, there is the natural difference in temperature between the water over the hot zones and that in the rest of the cooling system, and to some extent this difference is responsible for the circulation; this alone, however, would act sluggishly.

Ramifications of the Maxwell

Dealing Particularly with the "Special" Model

It is proposed to show in this article the latest type of the Maxwell line and the distinctive features of the models, also some of the processes of manufacture. A department is set aside to the testing of the various parts before being assembled in the chassis.

A NEW model has been added to the Maxwell line of cars manufactured by the Maxwell-Briscoe Motor Company, of Tarrytown, N. Y. It will be known as the Maxwell Special rated at 36 horsepower. In addition to this model the buyer's choice comprises the Maxwell Mercury, which is a roadster guaranteed to cover a mile a minute, rated at 30 horsepower; a 25-horsepower car known as the Maxwell Mascotte with either a touring or roadster body, ending up with the 16-horsepower runabout of the past season with certain refinements, now known as the Maxwell Messenger. The system of designating cars by name rather than by letters or numerals is a happy one, as it is more convenient to remember a car in this manner than by several meaningless hieroglyphics.

It is proposed in this article to deal more particularly with the Maxwell Special, and unless specific mention is made of any other model the description and details that follow will have reference to the Special. The motor is of the four-cylinder, four-cycle type, with the cylinders cast individually. The valves are placed on opposite sides of the motor as the cylinders have T-shaped heads. A general idea of the motor, together with the housing of the transmission and clutch units, can be seen by referring to Fig. 9, which shows the exhaust side of the motor, and Fig. 10, which shows the intake side, with the cover that encloses the timing gears, clutch and transmission removed. It will be seen in Fig. 9 that the flywheel is placed at the front extremity of the motor, and is cast from a special grade of iron, and is 19 inches in diameter. The face width is 2 1-4 inches, and in order to maintain a perfect balance both the sides and the face are ground, which operation is shown by referring to Fig. 18, from which it will be seen that the weight is carried at the periphery and the spokes form a fan to assist in inducing an air draft through the radiator. The bore of the Special model is 4 1-4 inches, and the stroke of the piston is 5 1-4 inches. The extreme length of the cylinders is 9 29-32 inches. The valves are of the mushroom type and the diameter of the valve seat opening is 1 3-4 inches, and the lift allowed to the intake valves is 5-16 of an inch, while the exhaust valve is given a lift of 11-32 of an inch.

A point of which the average owner of a car is ignorant is the proper timing of his motor. In the Maxwell Special the intake valve opens 15 degrees after top dead center, or 2.487 inches on the rim of the flywheel, and closes 40 degrees, or 6.632 inches on the rim of the flywheel after the lower dead center. The exhaust valve closes 10 degrees, or 1.658 inches on the rim of the flywheel, after the top dead center and opens 40 degrees, or 6.632 inches on the rim of the flywheel before lower dead center. From this it will be seen that there is a period between the closing of the exhaust valve and the opening of the intake when the cylinder is in a manner creating a vacuum, and it has been found by the manufacturers of this car that this method of timing tends to induce a stronger depression in the carbureter, thereby filling the cylinders with a proportionately larger amount of mixture properly atomized.

The crankshaft shown in Fig. 1 has five main bearings, which are plain babbitt, and the diameter of the journals is 1 3-4 inches. The length of the front bearing, the extension of which carries the flywheel, is 3 1-4 inches long. The intermediate bearings are 2 5-8 inches, and the rear bearing is 2 13-16 inches long. It will be seen that a gear is attached to the end of the crankshaft and this forms the master pinion for driving the trains of half-time gearing. The clutch assembly is attached to the extension arm piece on the end of the crankshaft and the primary shaft of the transmission, which is of the square type, on which the sliding gears are attached, being a continuation thereof, terminating in a step type of journal, and the master part of the universal joint that is placed outside of transmission housing. The piston, together with the connecting rod, cap, bolts and shims, are shown in Fig. 21. The piston is first turned and afterward ground from a special gray iron, the grinding operation being shown in Fig. 18. The operator, in this illustration, can

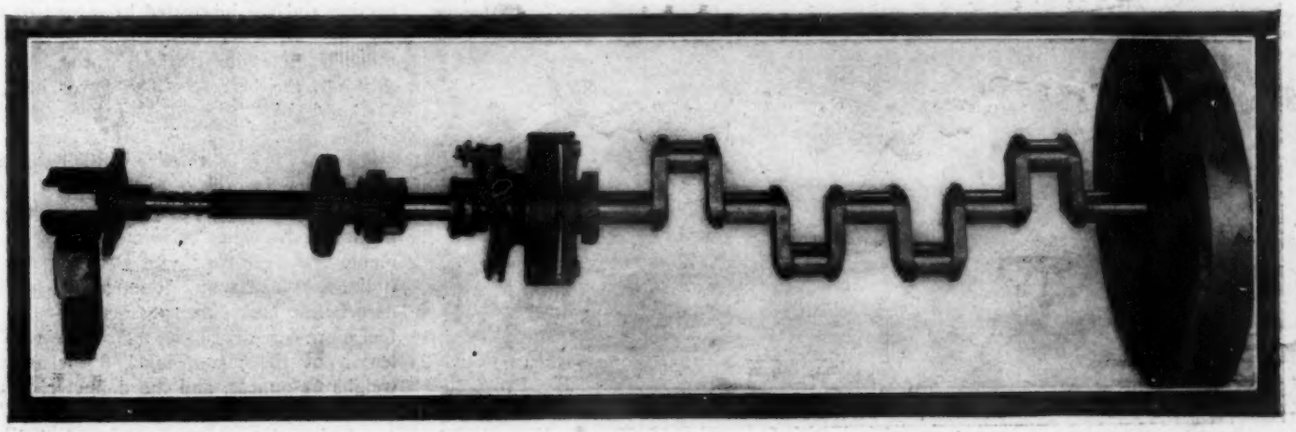


Fig. 1—Showing the assembly of the flywheel, crankshaft, clutch, primary shaft of the transmission, sliding gears and universal joint

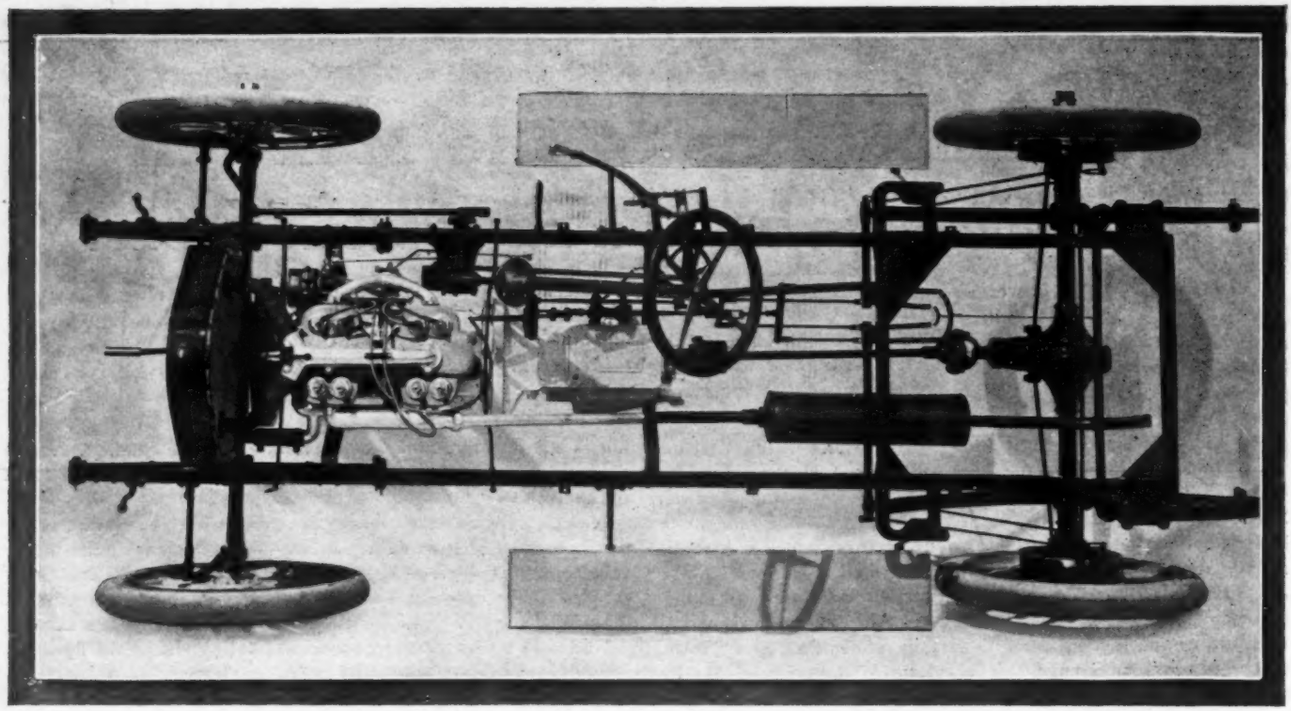


Fig. 2—Plan view of the Maxwell Mascotte chassis, showing the assembly of the motor with its three-point suspension and other details

be seen placing micrometer calipers on the piston to determine down to an infinitesimal small margin the necessary clearance for a good working fit. The cylinders are treated in a similar manner, only in this case a special cylinder grinding machine is used instead of the one illustrated in Fig. 17. Fig. 21 shows the piston P, which is fitted with four piston rings with diagonal slots. The ring R4 is placed near the base of the piston, and while retaining a goodly quantity of lubricant between it and the ring R3 serves, in a measure, to prevent an excess of oil escaping past it, which would thereby find its way into the cylinder spaces.

The lubrication system in this motor might be termed the semi-splash system. The actual lubrication of the reciprocating part is dependent upon splash. Beneath each connecting rod a trough T, as shown in Fig. 21, is screwed in position by the four arms A1, A2, A3 and A4, and the cap of the connecting rod is fitted with a knife-edge extension K seen in the same illustration, which churns the oil up at each revolution of the crankshaft.

Fig. 22 shows a sectional view of the base chamber with the two center connecting rods dipping into the scoops. Below the scoops the base chamber forms a reservoir for the oil that is poured in through the filler O, the correct level being ascertainable by opening the cock C1 while the oil is being poured in. Should the oil, however, reach above the level of this drain-cock, the motor will not of necessity become over-lubricated unless the oscillations of an uneven road were to cause the oil to be thrown up in larger quantities than was provided for by the makers. Fig. 9 shows the exterior of the base chamber and a gear-driven pump P driven by helical gearing from the exhaust camshaft. The oil is taken along the pipe P1 in Fig. 22 into the pump and thence driven under pressure to a sight feed situated on the dashboard. In some makes of cars this feed is so small that, owing to the dirty state of the oil that is continually being passed through the motor, the sight feed becomes black and it is impossible to see whether the oil is circulating or not. This fault cannot be laid at the door of the Maxwell. Fig. 15 shows the size of the sight feed at O. After the oil has passed through the feed it returns along a single pipe which passes the whole length of the base chamber, and maintains a steady stream to each trough below the crank throws. The big ends of the connecting rod are lubricated by means of the oil that finds its way down the slot S, there being a hole drilled at the base of this into the bearing. The lower half of the bearing is also drilled so that each half of the journal receives its full quota of lubricant. The bearings are filled with an anti-friction metal and five shims of varying thicknesses are provided for each connecting rod so that an infinitesimally small amount of wear can be taken up as soon as it becomes apparent. Refinements of this description make the possessor of a car feel more confident in its maintenance. The length of the piston is 4 5-8 inches and weighs 61 ounces, and the diameter of the piston pin is seven-eights of an inch. The camshafts of the motor are driven by helical-cut gears driven from the master wheel,

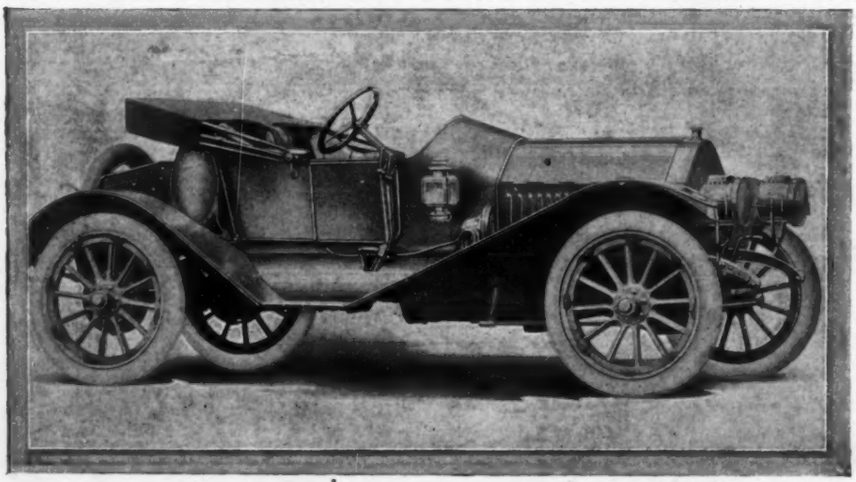


Fig. 3—General appearance of the Maxwell Mercury Roadster, with vestibule body

which is attached to the crankshaft. The diameter of the camshaft is three-fourths of an inch and is supported by five plain babbitt bearings which are driven into the aluminum housing, and afterward reamed to size. The cams are attached to the camshaft by means of taper pins. Fig. 14 shows the operation as carried out in Tarrytown of cutting the gears for the halftime wheels. Both sides of the motor, as can be seen from Figs. 9 and 10, are fitted with inspection doors which make it possible to readily inspect the working parts of the motor without taking same asunder. The crankshaft is held in position at its front and rear extremities by covers formed integral with sliding blocks that complete the housing fore and aft of the base chamber. This style of fitting is carried out in the transmission, which makes it possible after the cylinders have been removed to lift out the whole unit as shown in Fig. 1.

In Fig. 12 is shown the front end of the motor and the method in which the Splitdorf magneto is held in position. The intake camshaft is extended through the base chamber and attached to it is a gear wheel which meshes with the gear attached to the armature shaft of the magneto, and being geared two to one, the magneto runs at engine speed. A cover is provided that fits over the gears and in order to eliminate noise the magneto gear wheel is made of compressed fiber faced on both sides with a sheet of steel to prevent any expansion under load. The extension of the crankshaft carrying the flywheel also forms the resting place for a pulley wheel which drives the fan belt. The ignition is obtained by means of a magneto in connection with a non-vibrating coil and batteries for starting.

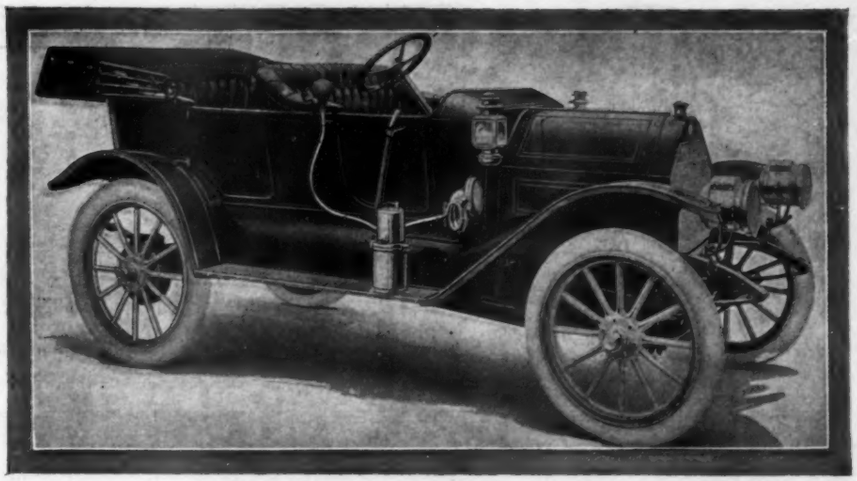


Fig. 4—Maxwell Mascotte 25-horsepower touring car with flush-sided fore-door vestibule body

The location of the coil is well shown in Fig. 15, where it will be seen that a switch is provided upon the coil controlling both battery and magneto ignition. Fig. 9 shows the method adopted on this model of casting the cylinders and introducing the water to the lowest point of circulation at W1, W2, W3 and W4. The water is circulated on the thermo-syphon principle, the pipe conducting the water back to the radiator being of large diameter and bifurcated at the point where it leaves the forward cylinder, entering the radiator at two points a little over half way up, instead of at the top as is usual. A fan driven by a circular rawhide belt provided with a ready means of taking up slackness maintains a good suction of air through the radiator at all speeds of the motor, and as it runs upon ball bearings little power is taken up in its operation.

The carbureter, of the float feed constant level type, is located on the right-hand side of the motor and placed sufficiently high to permit of easy adjustment if it should be found necessary at any time.

The clutch employed on this model is of the multiple-disc type, both sets of discs being made of steel with ground faces. The component parts of the clutch may be seen by referring to Fig. 6. The part A is attached to the crankshaft, and bolted thereto by means of studs S and S1 is a crosshead C. This has two protrusions upon which the part is resting engaging the jaws J and J1. The disc D with a castellated shaft

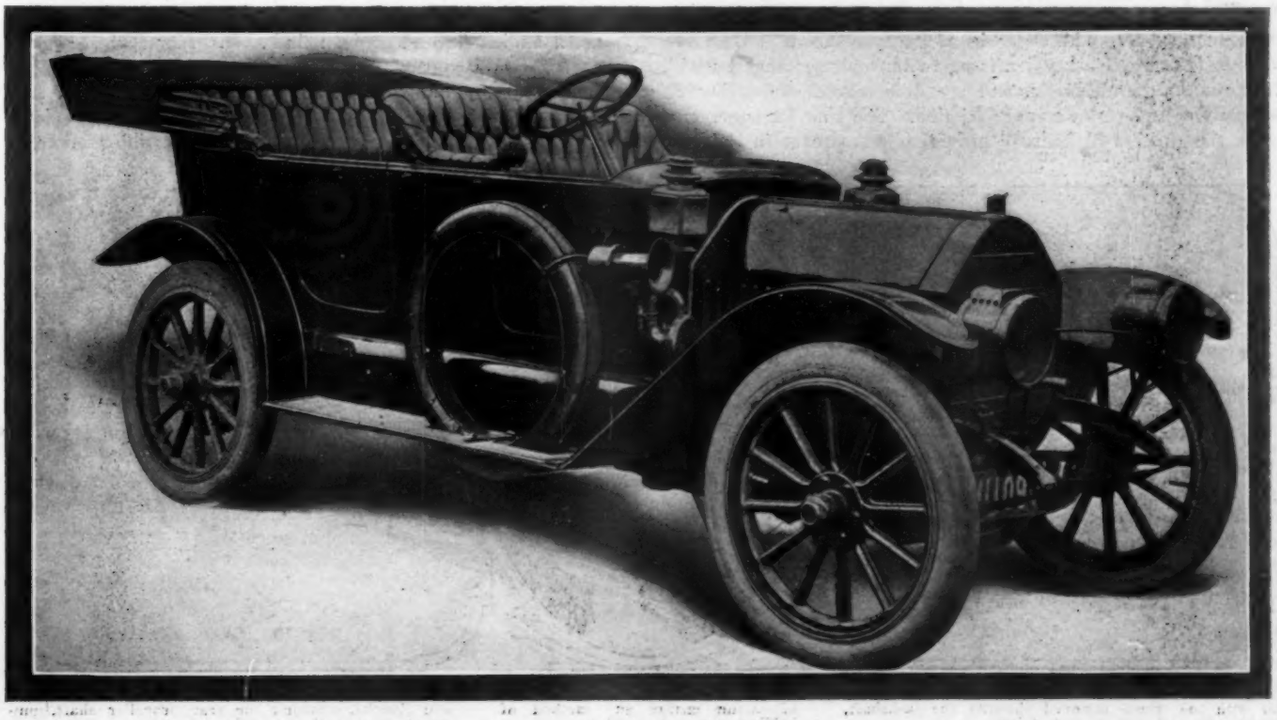


Fig. 5—Showing the Maxwell Special 36-horsepower fore-door touring car with full equipment

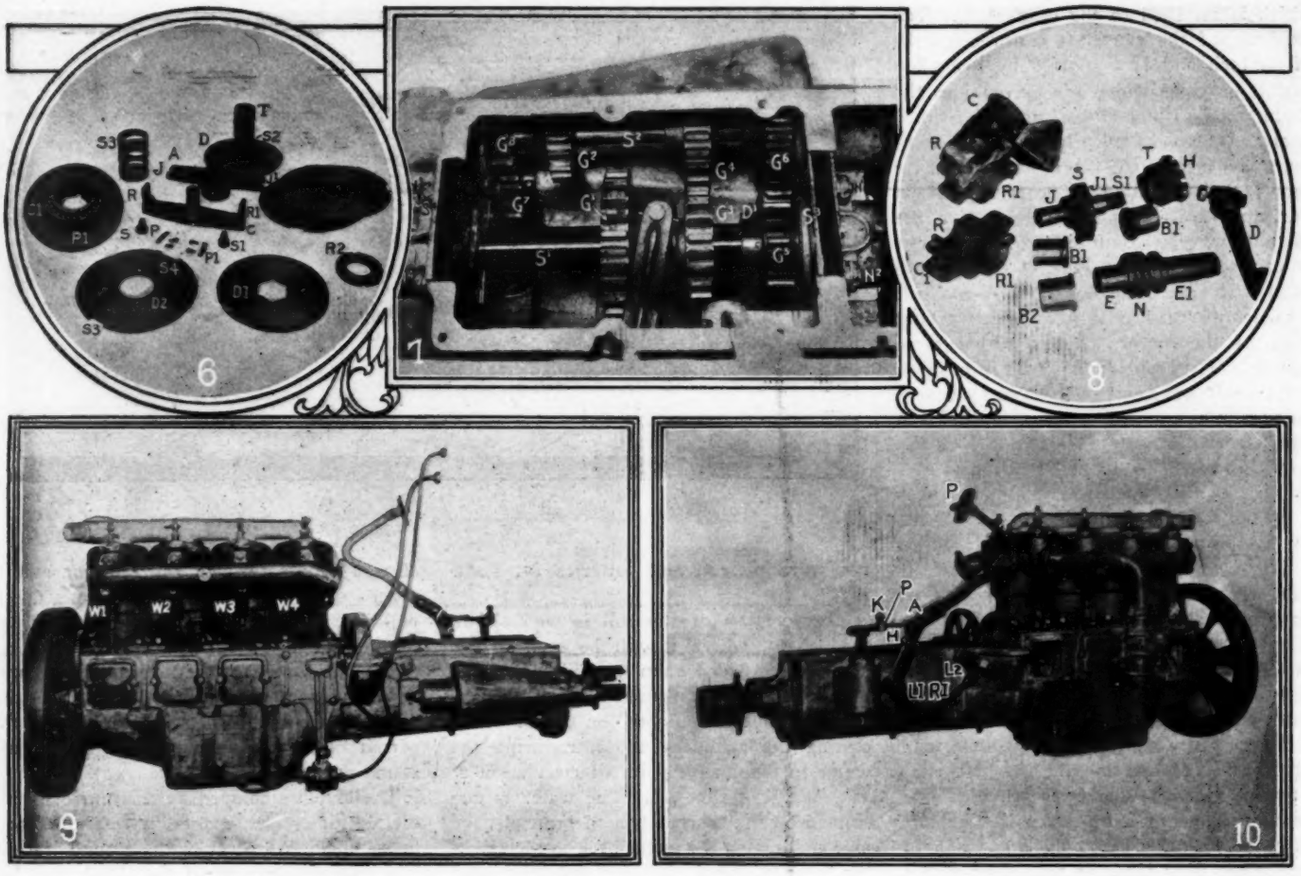


Fig. 6—Showing the various component parts forming the clutch assembly

Fig. 7—Plan view of the transmission as fitted to the Maxwell Special

Fig. 8—Various parts forming the general assembly of the steering mechanism

Fig. 9—Exhaust side of the Maxwell Special motor, showing the method of obtaining a three-point suspension and the lubricating pump

Fig. 10—Intake side of the Maxwell Special motor, showing the adjustable valve push rods, and half-time gearing and pedal control

S2 passes over the journal J2 and alternate discs of the type as shown at D1, which have six slots cut in them to correspond with the keys on the shaft S2, form the driving members. The ribs R and R1 engage with the slots S3 and S4 of the disc D2 which alternate with the discs of the type shown at D1. The plate P1, the inside of which is cut with keyways, engages with the keys on the shaft S2, and the pressure of the spring S3 maintains the plates in contact relation. The ring R2 is screwed on to the threads T, thereby providing adjustment in the case of wear. A collar C1, which is at the same time a ball bearing, receives the engagement fork and compensates for the thrust when the clutch is disengaged. The parts P and P1 are attached to the ends R and R1 by the set screws, thus preventing the plates from expanding beyond a given limit. In order that the plates may properly disengage the driven plates of the D2-type they are cut at four points and the edges turned outward as a substitute for disengagement springs. The clutch is operated by a pedal P1, shown in Fig. 15, which, at the same time, serves to

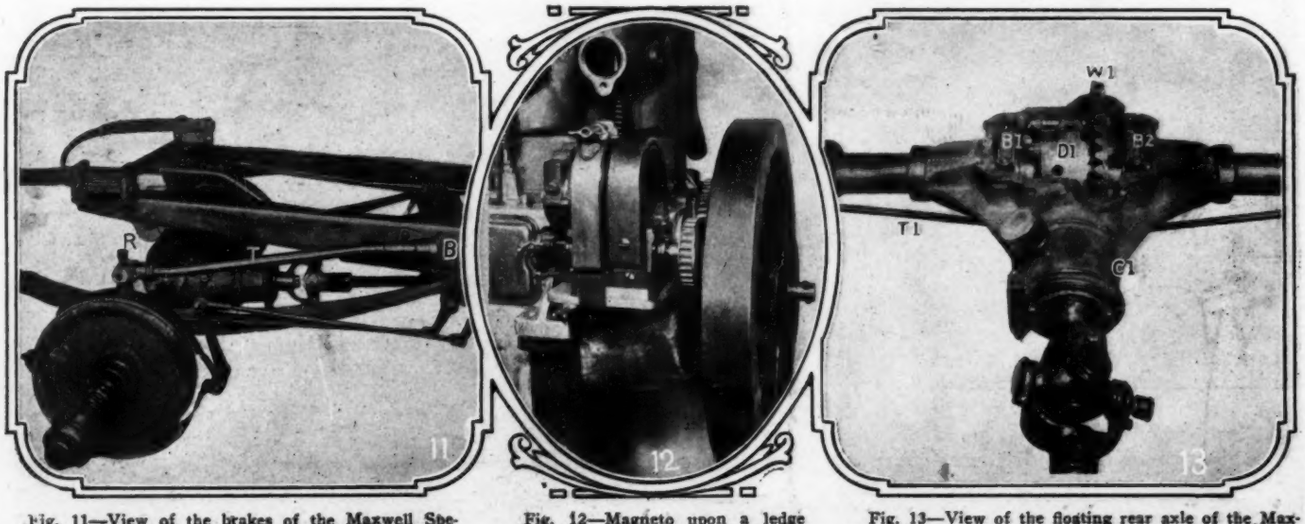


Fig. 11—View of the brakes of the Maxwell Special with the wheel removed showing the jackshaft, torque rod and spring suspension

Fig. 12—Magneto upon a ledge of motor casting and method of holding same in position

Fig. 13—View of the floating rear axle of the Maxwell Special, showing the rear propeller shaft, universal joint and the differential

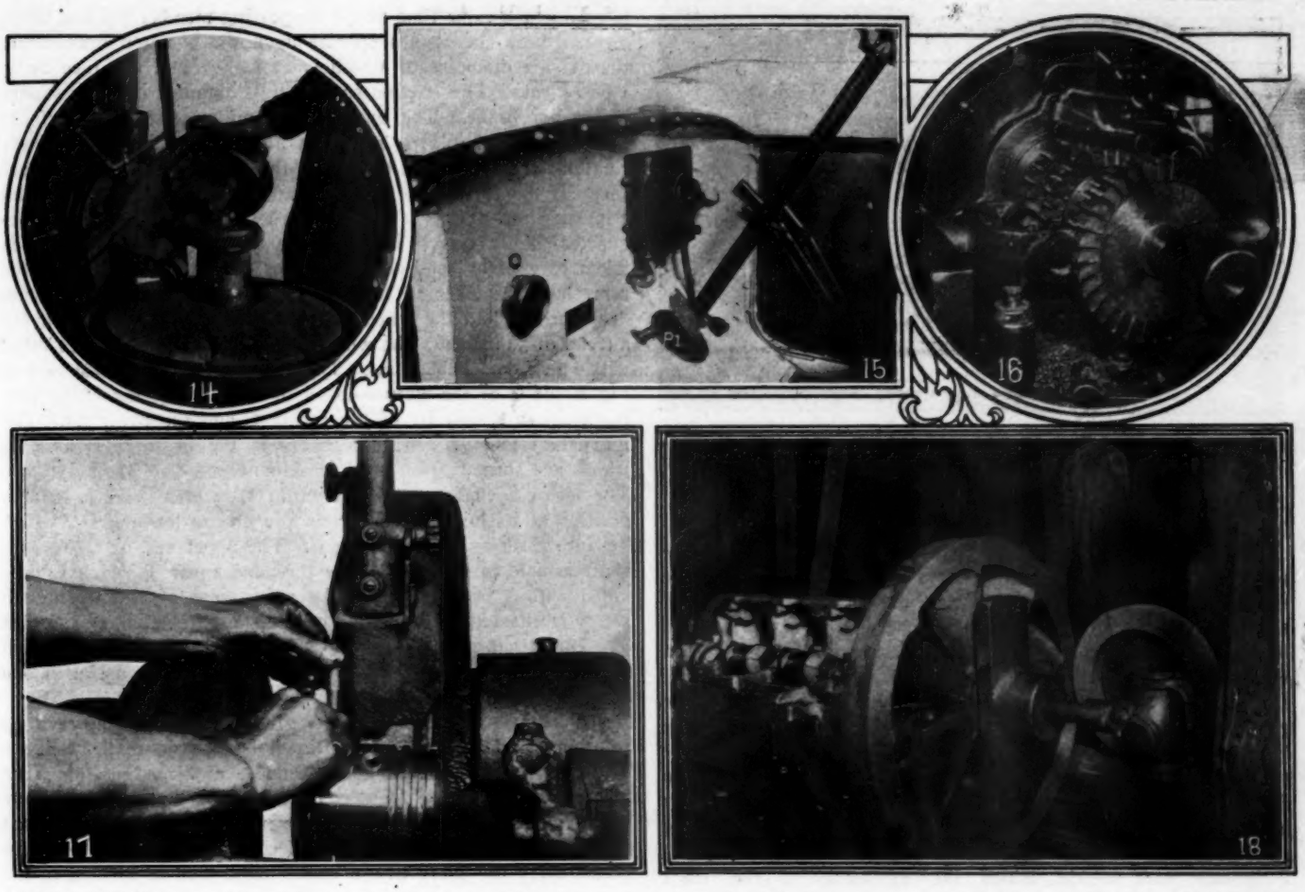


Fig. 14—Showing the method employed in Maxwell plant of cutting timing gears

Fig. 15—View of the aluminum floorboards and curved dash, showing the various control mechanisms

Fig. 16—Method employed of surfacing four sides of universal joint fork at once

Fig. 17—In order to obtain an accurate fit of the piston in the cylinder grinding to close limits is employed

Fig. 18—Showing the method of grinding the faces of a flywheel using a proper crankshaft and base chamber as a jig

apply the emergency brake when pushed right home. The general assembly of the pedal and interlocking mechanism is shown in Fig. 10. When the pedal P is depressed the lever arm L1 is drawn backward carrying with it the rod R1 and the lever L2. This lever is attached to a cross-shaft inside the clutch housing to which in turn is attached a cam. This cam forces the disengagement fork backward and an adjusting screw as provided serves to regulate the amount of disengagement. The hole H receives the rod that operates the emergency brake and by depressing the pedal farther than is necessary to disengage the clutch the brake is brought into action. The knob K in Fig. 10 is connected to the change-speed lever, and a device is provided which makes it impossible to change speed unless the clutch is withdrawn, or to engage the clutch unless the gear lever is either in the neutral or one of the gear positions. This consists of a plate P which rotates with the knob K and fitted with slots and it is necessary for the arm A of the change-speed pedal to engage one of these slots otherwise the clutch is withheld. The

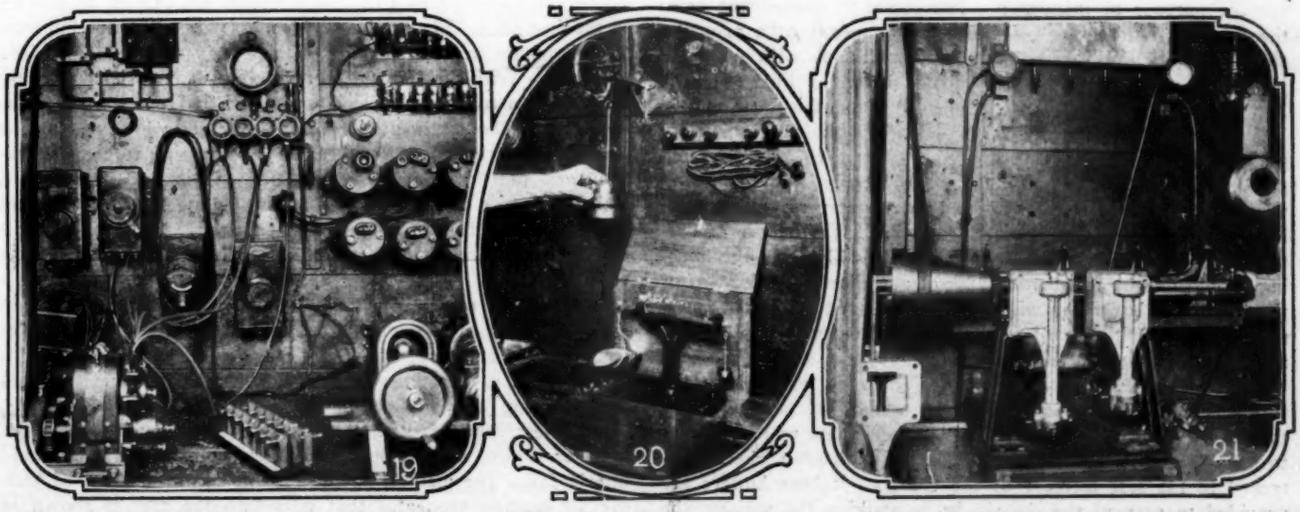


Fig. 19—Testing bench in the Maxwell plant for controlling all electrical equipment before going into the car

Fig. 20—Method employed in the Maxwell plant of testing for tension of piston rings

Fig. 21—Method employed of testing the lubricating oil pumps at various speeds by means of a belt and step pulleys

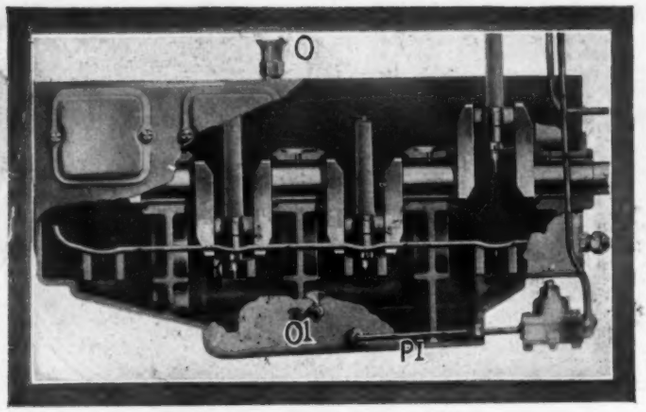


Fig. 22—Section through the Special motor, showing the connecting rods dripping in the troughs, the oil reservoir, oil pump and leads

emergency brake, which is operated by a lever placed on the right of the driver, also disengages the clutch in the same way as indicated by the emergency brake pedal, a separate cam being employed. Ignition and throttle levers are provided below the steering wheel, working on ratchet sectors, and a pedal is also employed to control the gases. The general control can be seen by referring to Fig. 15. The transmission is shown as seen from above in Fig. 7. The lever which operates the train of sliding gears works in a push-through type of quadrant. The gear G1 when meshing with G2 gives the first speed. When the gears G3 and G4 are in mesh, as shown in the illustration, the second speed is in operation. The high gear is obtained when the dogs D1 are caused to mesh with the corresponding members in the interior of G3. G5 is attached to the extension of the clutch shaft and is in constant mesh with G6. The gear G5 has a bronze bush within which the extension of the shaft S1 runs. The power is transmitted from G5 to G6 and thence to the several gears situated on the shaft S2, and so back to the primary shaft S1 when the gears are caused to mesh by the shifting fork F1. The reverse is obtained by meshing the gear G1 with the gear wheel G7. In this case the power is transmitted from G5 to G6, thence to G8, which is in constant mesh with G7, and so back to G1.

The secondary shaft S2 is carried at its forward and rear extremity upon long roller bearings, and the primary shaft S1 on anti-friction white metal bearings. The slides S3 and S4 form the upper half of the bearings and are detachable by removing the nuts N1, N2, N3 and N4. The cover that encloses the transmission is made in one piece together with the part that encloses the timing gears and clutch housing, and is readily removable for the purpose of inspection. The power is transmitted from the transmission to the live rear axle by means of a propeller shaft fitted at the forward and rearward ends with universal joints, the rear universal joint being shown in Fig. 13. The live rear axle is of the full-floating type and this is shown in Fig. 13 with the half cover removed. The driving pinion together with its bearings is housed in the part of the casing marked C1, and the differential assembly comprising the crown wheel W1, differential cage D1 and the supporting bearings are held in position by the braces B1 and B2. When these are removed it is possible to lift the differential bodily from the housing should this be found necessary at any time, of course, after the jackshafts have been withdrawn. A tie rod T1 is placed beneath the axle with an adjustment at either extremity and serves as a strengthening member. Fig. 11 shows the assembly of the brakes, the jackshaft and the torque member, as well as the three-quarter elliptic springs, and the method of attachment of the latter. The torque tube T1 is attached at its rear extremity to an arm and at the forward extremity to a ball socket. B attached to the side member of the chassis. Rubber buffers are provided to prevent the chassis frame striking the springs, the forward ends of which are supported in a common bracket that is used at the same time as the supporting member for the brake levers. Both the brakes operate upon the common brakedrum, the outside diameter of which is 12 inches, and the face being 1 3-16 inches. The friction surface thus obtained is 82 1-2 square inches per brake. The operation of milling the four surfaces of the universal joint is shown in Fig. 16 in which four cutters rotate at the same time and plane the interior and exterior surfaces of the fork. The rear springs are 50 1-2 inches long and 2 inches wide, and as it can be seen by Fig. 11, are of the three-quarter-elliptic type. The front suspension of the chassis is taken care of by semi-elliptic springs of the same width as the rear, but 36 inches in length. The front axle is an I-beam drop-forging and the wheelbase of the car is 114 inches having a tread of 56 inches. The wheels are 34 x 4 inches and are fitted with quick detachable rims. The steering assembly is shown in Fig. 8. It is of the worm-and-sector type, the sector fitting into the recesses R and R1 of the casing C and the cover C1. The journals J and J1 run respectively in the bearings B and B1 which are turned from steel, case-hardened and ground to fit. The sector S engages with the worm W, which latter is held in position at its lower extremity in the bronze bushing B2, which fits into a recess of the casing C. The upper end of the worm-shaft is held in position by the threaded cover T which is provided with a bronze liner. The adjustment of the worm and sector is effected by tightening of the slotted head H of the part T. The drop arm of the steering D is attached to the square end S1 of the sector S, and a bolt which engages with a slot in one of the angles of the squares maintains the parts rigid.

The general appearance of the Maxwell "36" can be seen by referring to Fig. 5, in which it will be noticed that the shape of the radiator has been altered and is now made of the true honeycomb type. The front compartment of the fore-door body is provided with ventilators, thereby removing an objection that is sometimes made for this style of coach work, and in order to better carry the spare tire, a countersunk well is formed in the runningboard as shown in the illustration. Besides supporting the tire better, the reduction in height greatly improves the appearance of the car. It will be noticed that the side balances between the runningboard and the chassis frame entirely cover in such parts as spring shackles and brake levers, and give the car a very clear aspect. The Maxwell Mercury mile-a-minute roadster is shown in Fig. 3, with large capacity gasoline tank, waterproof baggage compartment and spare tire carried behind the bucket seats. The general appearance of the Maxwell Mascotte 25-horsepower touring car, having a 4 x 4-inch motor, is shown in Fig. 4, the chassis of which is shown in Fig. 2.

In order to ensure that the parts that are fitted in Maxwell cars have been thoroughly tested before being delivered to the chassis assembling department, a special force provided with the proper facilities makes a thorough test of the various assemblies in the first place. Fig. 21 shows the manner in which the lubricating oil pumps are attached by suitable means to an improvised camshaft. With the aid of the step pulleys it is possible to cause the pump to rotate at a speed equivalent to from 4 to 60 miles per hour. The oil is then forced to gauges which are placed on the testing board, as can be seen by referring to the illustration, and the flow thereby ascertained. It is not often that a leak in this type of pump occurs, but it may happen that the gears are either to tightly in mesh or not enough so, in which case all errors can be rectified before the car is handed over to the customer.

It is of vital necessity for any company who wishes to obtain the confidence of the buying public that it should make independent tests of all apparatus that it does not manufacture itself. A point that is sometimes overlooked by testers is that although a spark plug may fire perfectly under atmospheric conditions, nevertheless, when under the pressure of the compression in the cylinder, which, for example, may be 70 pounds, the plug would utterly fail. The method adopted in the Maxwell plant of testing all ignition apparatus that goes into the cars is shown in Fig. 19. The magneto is fitted to a base and rotated at varying

speeds by means of a belt. The spark plugs are screwed into small chambers C1, C2, C3 and C4, provided with glass windows. Pressure is then introduced into these chambers, the amount being indicated by the dial D. A relief valve V placed in the air circuit regulates the amount of pressure in the small compartments and by turning this either to the right or left, in which case the pressure is varied, it is possible to ascertain if either the plug or the magneto which includes the step-up transformer coil are in working order.

In order that the compression of the motor in each of the four cylinders should be maintained uniform, it is necessary that the tension of the piston rings should be equal, for, unless this is so, a certain amount of compression will be liable to leak, thereby upsetting the carefully planned calculations of the designers. The method adopted can be seen by referring to Fig. 20. A bracket is provided in which the lower half of the piston ring is attached by means of a thumb-screw. The opposite side of the slot is then attached to a bracket having two arms, from which is suspended a hook which in turn carries a weight balance. The operator in this instance is seen placing an additional weight upon the balance, and a ready calculation of the weights imposed will give the tension of the ring.

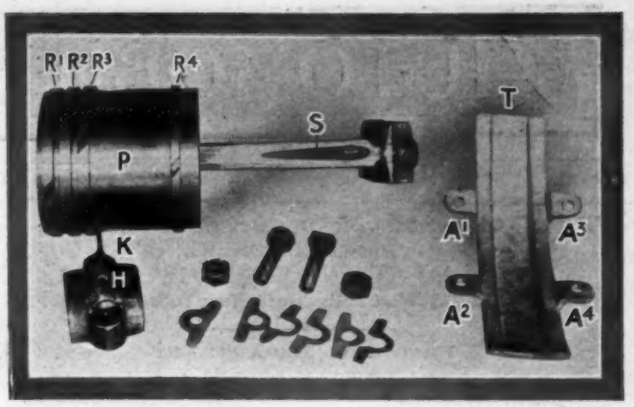


Fig. 23—Showing the piston, connecting rod, cap and shims and one of the troughs used in the lubricating system

A Muddy Weather Tip

STARTING a car on a muddy day is a most disagreeable undertaking, as the starting handle is usually besmeared with mud. This may in a measure be overcome by fitting a boot for the handle to rest in, but the leather soon becomes sodden with moisture and the consequences are almost as bad as if no protection at all were used.

Quite apart from the inconveniences that attend the starting there is another aspect that is more important. The mud that is thrown up by the front wheels bespatters the face of the radiator and quite a large proportion is sucked between the interstices thereby restricting the flow of air that has to pass in order to effectively cool the water. Some of the foreign matter finds its way into the motor compartment and if allowed to remain will cause rust to set in, the disadvantages of such a state of things being obvious.

In order to overcome these inconveniences, a pair of leather flaps can be made so that they can be attached by strips extending sufficiently low to protect the starting handle and carried up slightly above the frame to protect the radiator. Being detachable and perhaps detracting from the general appearance of the car, they may be carried under the seat ready in case of need.

Calendar of Coming Events

Handy List of Future Competitive and Show Fixtures

Shows

Jan. 1-5, 1912.....New York City, Grand Central Palace, Annual Show, Automobile Manufacturers' Association of America.
Jan. 6-13.....New York City, Madison Square Garden, Twelfth Annual Show, Pleasure Car Division, Automobile Board of Trade.
Jan. 10-17.....New York City. Madison Square Garden, Annual Show, Motor and Accessories Manufacturers.
Jan. 10-17.....New York City, Grand Central Palace, Twelfth Annual Show, National Association of Automobile Manufacturers.
Jan. 15-20.....New York City, Madison Square Garden, Twelfth Annual Show, Commercial Division, Automobile Board of Trade.
Jan. 27-Feb. 10....Chicago Coliseum, Eleventh Annual Automobile Show under the auspices of the National Association of Automobile Manufacturers.
March 2-9.....Boston, Mass., Tenth Annual Show, Boston Automobile Dealers' Association, Inc.

Race Meets, Runs, Hill-Climbs, Etc.

Sept. 6-9.....Buffalo, N. Y., Grade I, Reliability Run, Automobile Club of Buffalo.
Sept. 8-9.....Hamline, Minn., Track Races, Minnesota State Automobile Association.
Sept. 9.....Augusta, Me., Hill Climb.
Sept. 9.....Cincinnati, O., Road Race, Fern Bank Dam Association.
Sept. 9.....Hartford, Conn., Track Races, Connecticut Fair Association.
Sept. 9.....Port Jefferson, L. I., Hill Climb, Port Jefferson Automobile Club.
Sept. 9.....Riverhead, L. I., Road Race, Port Jefferson Automobile Club.
Sept. 12-15.....Omaha, Neb., Third Annual Endurance Run, Omaha Motor Club.
Sept. 13.....Grand Rapids, Mich., Track Races, Michigan State Auto Association.
Sept. 15.....Knoxville, Tenn., Track Races, Appalachian Exposition.
Sept. 16.....Syracuse, N. Y., Track Races, Automobile Club and Dealers.
Sept. 16-17.....Kansas City, Mo., Track Meet.
Sept. 18-20.....Chicago, Ill., Commercial Reliability Run, Chicago Motor Club.
Sept. 19.....Burlington, Vt., Reliability Run, Merchants' Protective Association.
Sept. 23.....Philadelphia (Point Breeze), Track Races, Philadelphia Automobile Trade Association.
Sept. 23-25.....Detroit, Mich., Track Races, Michigan State Agricultural Society.
Sept. 25-30.....Atlantic City, N. J., Convention and Exhibition of the Carriage Builders' National Association.
Sept. .....Denver, Col., Track Races, Denver Motor Club.
Sept. .....Steubenville, O., Hill Climb, Automobile Club of Jefferson County.
Oct. 6-13.....Chicago, Ill., Thousand-Mile Reliability Run, Chicago Motor Club.
Oct. 7.....Danbury, Conn., Track Races, Danbury Agricultural Society.
Oct. 7.....Philadelphia, Fairmount Park Road Races, Quaker City Motor Club.
Oct. 7.....Springfield, Ill., Track Races, Springfield Automobile Club.
Oct. 13-14.....Atlanta, Ga., Track Races.
Oct. 14.....Santa Monica, Cal., Road Races.
Oct. 14 (to 25)....New York City, Start of the Annual Glidden Tour, en route for Jacksonville, Fla.
Oct. 16-18.....Harrisburg, Pa., Reliability Run, Motor Club of Harrisburg.
Nov. 1.....Waco, Tex., Track Races, Waco Auto Club.
Nov. 2-4.....Philadelphia, Reliability Run, Quaker City Motor Club.
Nov. 4-6.....Los Angeles,-Phoenix Road Race, Maricopa Auto Club.
Nov. 9.....Phoenix, Ariz., Track Races, Maricopa Automobile Club.
Nov. 9, 10, 12.... San Antonio, Tex., Track Races, San Antonio Auto Club.
Nov. 27.....Savannah, Ga., Vanderbilt Cup Race, Savannah Automobile Club.
Nov. 30.....Los Angeles, Cal., Track Races, Motordrome.
Nov. 30.....Savannah, Ga., Grand Prize Race, Savannah Automobile Club.
Nov. .....Columbia, S. C., Track Races, Automobile Club of Columbia.
Dec. 25-26.....Los Angeles, Cal., Track Races, Motordrome.

Foreign Fixtures

Sept. 9.....Bologna, Italy, Grand Prix of Italy.
Sept. 10-20.....Hungarian Small-Car Trials.
Sept. 16.....Russian Touring Car Competition, St. Petersburg to Sebastopol.
Sept. 17.....Semmering, Austria, Hill Climb.
Sept. 17.....Start of the Annual Trials Under Auspices of *l'Auto*, France.

THE AUTOMOBILE

Vol. XXV Thursday, September 7, 1911 No. 10

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Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

GREATER ACCESSIBILITY NEEDED

ACCESSIBILITY is more needed on many cars than any other feature at the present time. Accessibility is needed because it reduces cost of car operation. The lack of accessibility means expense. That car does not exist which will not give trouble sooner or later; it may have a clean sheet for a good many miles, but the day will come when an exhaust valve spring will weaken and a new spring have to be used; then comes the test of accessibility. It is a difficult task to change a valve spring on some motors. Often on the exhaust side the manifold is carried so low down that it is difficult to get an ordinary valve-removing tool into position without danger of getting the hands burned by rubbing against the hot manifold. Added to this complication is that of having the magneto mounted so that it is directly in the way of reaching one, or perhaps two, of the springs, and here is where more time and patience are lost.

The foregoing is but an introduction to the opening chapter of what might develop into a resumé on inaccessibility in motor cars. Go to the opposite end of the car and try to adjust the emergency or foot brakes on not a few machines. In some it is an impossibility to adjust them without getting on your back on the ground, with your head perhaps in advance of the axle. When in this position it is further necessary to work your entire arm up through a labyrinth of rods, etc., to some out-of-the-way wingnut or perhaps an ordinary nut with lock nut. These have to be turned by a special wrench; it would be bad enough if they could be worked by hand, but demanding the use of a special wrench in such a restricted quarter adds to the misery. When the thought-to-be-right adjustment has been made the driver, owner or passenger, worms himself out from under the car and tries his brakes only to find that they have been over-adjusted or not adjusted quite enough. He repeats his laborious performance once again and, if good luck is not on his side, he may have to perform the task a third time. It takes a lot of patience for such gymnastics; it takes a lot of clothes also, and if the owner has put on a holiday suit it is ready for the cleaners, even although he has made use of a long duster in his work.

The majority of motors need to have the carbureter primed occasionally before starting. There are a score of cars at present on the market in which you run a big chance of getting three or four grease spots on the coat sleeve every time you reach in to press on the priming rod. This is expense to the owner. He may not charge it up to the operating expenses of the car for the year, but he should. It is just as much an expense as buying a new tire is; just as much an expense as having the brass work cleaned; just as much an expense as having the body polished from time to time, and just as much an expense as having the carbon removed from the cylinders. Car owners should be honest with themselves and keep the expense account correctly.

Every car owner should remember that inaccessibility is costly and particularly so when his car goes into the repair shop to have some part repaired or replaced. Every other part of the car that has to be removed before the broken part can be reached is adding to the cost of the repair. But this is only half of the story, as these inaccessible parts have to be put back in place again and the owner should bear in mind that he pays his 75 cents an hour for his inaccessibility. This is a part of the cost of operation. Not a few owners have wondered at the repairman's figures showing a certain repair on one make of car at a certain figure and the same repair on another car at nearly double the price. Inaccessibility is the answer. In buying a car the buyer should look to the costs of inaccessibility. He should look into the accessibility of the carbureter and its adjustments, to the brake adjustments, to the crankcase oil drains, to the clutch lubrication, to the lubrication of the universal joints, to the valve springs, to the fan adjustment, to the magneto, the water pump, the ignition wiring, the grease cups on the running gear in hidden places, as well as to a dozen or more details that will come up in the ordinary running of the car.

It would be a blessing to the industry if there were a reliability run every year in which the designing engineers were the drivers and mechanics. It would show to them the error of their ways in hundreds of cases. The points in question are often not engineering problems at all—the engineering design of the major part has been correctly carried out—it is the positioning of some appurtenance that gives the trouble. A carbureter may be of the best design obtainable, but if it is mounted with the needle valve or throttle adjustment between it and the motor crankcase it is entirely wrong. Cases of this kind are on record to-day; some makers who had such conditions a year ago have since altered them.

As a solution of the problem, or, better still, as a method of bringing accessibility more to the front, THE AUTOMOBILE suggests an accessibility contest for cars.

Instead of running the cars on the roads they are simply parked and the trial consists of removing parts from the cars and replacing them. Such a contest offers an unlimited field.

A few of its possibilities are: The time required to adjust each set of brakes; time needed to jack up a front or rear wheel; time to remove a carbureter; time to drain off water from a carbureter; time needed in changing a spark plug; time needed in draining the dirty oil from the motor crankcase and refilling; time needed to empty the gasoline tank and refill; time needed to adjust the clutch spring tension; time required to turn up all of the grease cups on the car; time that is taken to change a valve spring; time needed to put on a new fan belt; time required to adjust the lower bearing of a connecting rod; time to take off and replace the radiator; time for removing and replacing the magneto; removal and replacement of the water pump; putting on a new ignition terminal, etc., etc. The outcome of such a test would be most valuable, it would be an education to the car builders, and it would be a means of reducing cost of car operation to an amazing extent.

Garden Spaces Drawn

THE first official act of the Automobile Board of Trade in connection with the 1912 show at Madison Square Garden took place at 4 o'clock yesterday at headquarters, it being the drawing for positions at the show. In all 58 manufacturers drew for positions. The order of drawing was determined by the total value of cars manufactured by the different makers for the fiscal year up to June 30. This output was determined from the figures of the recent A. L. A. M. organization and by sworn statements from the different makers for their product from January 1 to June 30. First choice fell to the Buick Motor Company, who selected position 14 on the main floor. This is immediately in front of the entrance on the right. Second choice went to the Overland, who took position 15 on the center on the left. The order of the remainder in the oval in the center of the Garden floor was: E-M-F, Cadillac, Packard, Maxwell, Pierce, Chalmers, Hudson. The drawings beneath the gallery on the first floor in order were: Mitchell, Reo, Stoddard-Dayton, Oakland, White, Peerless, Locomobile, Oldsmobile, Stevens-Duryea, Winton, Pope-Hartford, Lozier and Franklin. Marmon could have had the last space on the main floor but preferred a position in the first balcony, this giving Stearns the last available place on the ground floor. The order of drawing for the first balcony was: Thomas, Everitt, Alco, Brush, Knox, National, Autocar, Premier, Elmore, Columbia, Jackson, Pullman, Haynes, Moline, Moon, Selden, Corbin, Lambert, American and Matheson. The drawing for Exhibition Hall on the ground floor was: Mercer, Case, Cartercar, Inter-State, Simplex, Amplex. The Speedwell had the preference of drawing before the Amplex, but preferred a position on the second balcony. The others in the second balcony in the order of drawing were: Garford, Ohio, Palmer & Singer, Marquette, Daimler, Atlas and McIntyre. These will occupy but one side of the balcony, the other side being given over to motorcycles. The usual space will be devoted to accessories. The show will be a duplication of last year, namely an exhibition for pleasure cars and accessories the first week and the second week devoted to commercial vehicles and accessories.

In the drawing nearly all of the companies were personally represented. Colonel George Pope was in charge assisted by M. L. Downs, secretary of the show.

Ask for Glidden Changes

BY far the most important feature that came up in conjunction with the meeting of the National Association of Automobile Manufacturers yesterday was a recommendation from this organization to the Manufacturers' Contest Association that a change be made in the 1911 contest rules of the A. A. A. governing reliability runs. The recommendation was to the effect that the rules be immediately changed so that a grade 4 reliability contest can be held without the entrants being registered stock cars. This recommendation was made at the request of President Hooper, Counsel Terry, and Chairman Butler, of the American Automobile Association, and was made so that the present Glidden Tour can be competed for by unregistered cars. The recommendation will be considered by the Manufacturers' Contest Association at its meeting to-morrow. The voting members of the N. A. A. M. were generally favorable to the change. If the change is made it will allow many private owners to enter the tour with cars which are not registered. This change if made will only affect grade 4 contests, which penalizes for lateness at controls only and does not take into consideration penalties for work done on the road or final technical examinations.

Another important matter was the receiving a recommendation from a special committee of the Manufacturers' Contest Association, headed by Howard Coffin and Howard Marmon, on the question of the future of contests. The M. C. A. Committee brought up the matter of the national organization financing the contest board, the contest board being merely a body for the sanctioning of contests. The matter was immediately referred to the contest committee of the N. A. A. M., which committee will report the matter at the October meeting.

Philadelphia representatives presented to the N. A. A. M. the outline of plans for the organization of an insurance company solely for the control of automobile insurance, which would cover every form of accident, fire, theft, etc. The proposed organization of such a company is the outcome of the dissatisfaction in settling present motor car insurance claims. No definite action was taken in the matter. The majority of the stock would be held by car and accessory manufacturers. One feature of the policies would be that cars damaged by accident or fire would be repaired at the agency or factory of said car.

List of General Motors Holdings

DETROIT, MICH., Sept. 4—An interesting document recently filed at Lansing gives what is believed to be the first authentic list of factories comprising the General Motors group. The list is as follows: Buick Motor Co., Cadillac Motor Co., Olds Motor Co., Elmore Manufacturing Co., Cartercar Co., Northway Motor and Manufacturing Co.; Marquette Motor Co., Randolph Motor Car Co., Rapid Motor Vehicle Co., Reliance Motor Truck Co., Welch Co. of Detroit; Welch Motor Car Co., Champion Ignition Co., Jackson-Church-Wilcox Co.; Michigan Auto Parts Co.; Oak Park Power Co., McLaughlin Motor Car Co., Ltd., and the Weston-Mott Co.

Annual Round-Up of Studebaker Dealers

DETROIT, Sept. 4—The present series of excursions being conducted by the Studebaker Corporation's E-M-F Company factories have taken a greater scope in introducing maker and dealer than anything of its kind. During the past week the Studebaker dealers from the Central and Western South have been present for two days each, as guests of General Manager Flanders. They will be succeeded by other delegations this week, as follows:

Sept. 5, Philadelphia and Washington; Sept. 6, Chicago, Ill.; Sept. 11, Dallas and Oklahoma; Sept. 14, Kansas City; Sept. 18, Indianapolis; Sept. 21, Minneapolis; Sept. 25, Fargo; Sept. 29, Des Moines and Sioux Falls.

Fast Time at Old Orchard

OLD ORCHARD, ME., Sept. 5—World's records were established at old Orchard Beach this afternoon. Unless there is some dispute over the length of the course—and there cannot very well be, for the A. A. A. has a certificate that it was of proper length—new marks have been set up for 25 miles and 50 miles.

In the 25-mile race (ten laps for the necessary distance), Louis Disbrow, in his special Pope-Hartford, nosed out Jack Rutherford in his National, in the last 500 feet of the route, and won in the remarkable time of 15:25—thought to be the record for the distance. The last event of the day, a race of 50 miles (20 laps of the course), was won by Rutherford, in his National, in 30.06 1-5, which, if correct, beats the old record by more than eight minutes.

The famous racers who have been at the three days' meet declared that Old Orchard Beach offers the best race course in the world. W. T. Kincaid, chairman of the contest committee of the Old Orchard Automobile Association, announced that there would be more races next year, earlier in the season, for three prizes aggregating $3,000. Following is a summary of Tuesday's events:

Mile Exhibition Against Time

Pos.	Car.	Driver	Time
	Stanley	L. F. N. Baldwin	:40

Five Mile Exhibition

	Pope-Hartford	Louis Disbrow	3:58

Twenty-Five Mile Free-for-All

1.	Pope-Hartford	Louis Disbrow	15:25
2.	National	John M. Rutherford	15:26
3.	Buick	G. C. Jessup	15:26⅛
4.	Pope-Hartford	C. L. Bowler	15:36⅛
5.	Interstate	Harry Endicott	15:39⅛

Match Race Ten Miles

1.	Cole "30"	V. A. Neilson	7:56⅛
2.	Interstate	H. J. Habich	7:56⅞

Fifty-Mile Race, Free-for-All

1.	National	John M. Rutherford	30:06⅛
2.	Pope-Hartford	Louis Disbrow	30:15⅞
3.	Pope-Hartford	C. L. Bowler	30:40⅛
4.	Interstate	Harry Endicott	
5.	Jackson Flyer	Harry Cobe	

SUMMARY OF MONDAY'S RACES

Special Match Race, Five Miles

Car.	Driver.	Time.
1. Cole 30	Henry I. Habich	8.04
2. Chalmers-Detroit	N. A. Mitchell	8.56

Exhibition, Five Miles for Record

	Pope-Hartford	Louis Disbrow	3.03

Free-for-All, One Mile Time Trials, $50

1.	Stanley Steamer	L. F. N. Baldwin	42 seconds
2.	National 40	John M. Rutherford	47 seconds
3.	Buick 17	G. C. Jessop	54 seconds
4.	Interstate	Harry Endicott	54 seconds
5.	Pope-Hartford	C. L. Bowler	57 seconds

Class D, Free-for-All, Ten Miles, $100

1.	National 40	John M. Rutherford	6.15
2.	Pope-Hartford	Louis Disbrow	6.23
3.	Pope-Hartford	C. L. Bowler	....
4.	Interstate	Harry Endicott	....

Exhibition Mile

	Stanley Steamer	L. F. N. Baldwin	44 seconds

The First Day's Races

The first day's races were thoroughly successful and well contested. In the ten-mile contest there was a tough fight for honors. "Jack" Rutherford's National 40 finally won out. He got the lead at the start and maintained it throughout the route, though he was hard pressed by Louis Disbrow in the Pope-Hartford. The time of the winner was 6 minutes and 15 seconds.

Old Orchard beach, in being laid out for races, presented some difficulties at first. The whole beach is fully six miles long, but at the west end there are rocks and in the middle is the famous Old Orchard steel pier. Pillars from this structure were removed and a good course, two and a half miles in a straight line, was provided. Over this the five-mile races and the ten-mile races were run and the mile races were pulled off with a straightaway course for the distance covered. It was thought at first that some accidents might result because of the passage under the pier, but there was not even a semblance of a mishap. The fact that it was a holiday attracted fully 50,000 people on the beach to witness the races. On the beach, the crowd extended for the full length of the course. The Seventh Company of the National Guard, under command of Capt. Goodier, of Biddeford, did patrol duty, and aided in keeping the crowd back from the course.

It looked for a while, though, as if the races would be called off for the people got too near the course and simply would not move, but they were finally forced back to proper limits.

In the mile time trials Baldwin, in his Stanley steamer, covered the course in 42 seconds, which was the best time. Rutherford closely approached him with a 47-second mile.

The really best time of the day was made by Louis Disbrow, in his Pope-Hartford, in an exhibition five-mile event. He covered the distance in 3.03, which was at the rate of better than 98 miles an hour. Rutherford, in the ten-mile free-for-all, did the course at the rate of 96 miles an hour.

Seventeen Start in Buffalo Run

BOLIVAR, N. Y., Sept. 6—Seventeen contesting cars made the start from Buffalo this morning on the first stage of the second annual reliability tour given under the auspices of the Automobile Club of Buffalo. Heavy showers last night made the roads out of Buffalo unspeakably bad and as the result few cars escaped penalty. The morning's run was through very hilly country and extra water and gasoline were required by the majority of the cars during the morning.

The run is scheduled for four days, each day's run ending at the parking station established on the spacious lot on Main street, just south of the Pierce-Arrow establishment. The outer mark on to-day's run is to Bolivar, N. Y.; Thursday, Dansville, N. Y.; Friday, Warren, Pa.; and Saturday, North Java, N. Y.

The tour is being run under the management of the Contests and Runs Committee of the Automobile Club of Buffalo, composed of Orson E. Yeager, chairman; Arthur W. Kreinheder, E. C. Sutton, I. N. Stewart, J. A. Murphy, Augustus H. Knoll and W. E. Blair.

There were nineteen entries, as follows:

Number	Car.	Driver
8	Everitt	J. W. Gardham
27	Paige-Detroit	J. E. McFadden
26	Warren-Detroit	J. S. Mohrhardt
21	Ford	G. Morton Wolfe
14	Ford	M. B. Leahy / F. L. Rockelman
12	Ohio	E. A. Glaney
5	Cole "30"	E. A. Green
6	Lion "40"	H. L. Blomstrom
11	Schacht	E. W. Werick / C. H. Werick
24	Oakland	Harold Harwood
20	Krit	Howard A. Bauer
29	Hupmobile	C. A. Almendinger / M. R. Birk
3	Flanders	B. W. Scott
4	Flanders	T. R. Bell
9	Flanders	G. M. Herron
1	Maxwell	Charles F. Monroe
2	Maxwell	E. G. Gager
10	Maxwell	Thomas Costello
28	Abbott-Detroit	Frank H. Denny

Good Racing at Salem

SALEM, N. J., Sept. 4—The happy combination of perfect weather conditions and a holiday, served to attract a throng of 5,000 enthusiastic spectators from Philadelphia and South Jersey towns to-day to witness the automobile races conducted under the auspices of the South Jersey Motor Club, at the organization's Labor Day matinee meet on the half-mile track here.

Although many of the races were not blessed with an overabundance of entries, interest was sustained throughout the afternoon and the crowd was well repaid by some clever and daring driving. All races were run off as originally carded with the exception of Event No. 3, which went by the board by reason of the failure of one of the cars entered to put in an appearance. In two other events the issue was settled without a struggle, two out of the three cars in one failing to finish, owing to mechanical trouble, and in the other, containing but two entries, one dropping out before the finish, the winners triumphing in hollow fashion.

The event that stirred up the most enthusiasm and which cre-

ated the most excitement was the trial against time for five miles. The former record for a half-mile track in New Jersey was 6:45, established at the Mt. Holly track, Mr. Harvey Ringler piloting a Mercer car, clipped two and one-fifth seconds from the old mark, the watches catching him as 6:37 4-5 seconds. Ringler was also successful in the first event, a five-mile affair, his opponent, Bob Morton, driving a Kline Kar, being forced to drop out. Tire trouble seemed to pursue the Kline Kar throughout the afternoon, as for one cause or another it failed to finish in any of the events entered.

The Velie car maintained its fine work of Saturday last at Pottstown and won both of the races in which it was entered, J. David at the wheel. Vincent Padula, of Philadelphia, had an easy time capturing the second event, five miles, neither of his opponents, a Kline Kar and a Metz, being able to stick.

In the concluding race of the day, a handicap event, the Abbott-Detroit, with Vincent Padula at the wheel and the Mercer car, Harvey Ringler driving, the finish was so close that the result is in doubt, there being little to choose between the two cars.

A.A.A. to Boost Good Roads

NEW YORK, Sept. 6—At to-day's meeting of the Executive Board, American Automobile Association, the National Good Roads Board was authorized to arrange for a Federal Aid Good Roads Meeting to be held in Washington, D. C., in September. The matter will be entirely in charge of Chairman Diehl of the Good Roads Board.

The North Dakota State Automobile Association was admitted into membership with the A. A. A. It is made up of three clubs and 200 individual members. This makes a total of 40 State associations in the parent body with an aggregate membership of over 50,000. The Bannock County Club of Idaho, and the Greensborough and Winston-Salem Clubs were admitted.

The matter of the Glidden Tour was taken up. At present there are thirty-five entries in hand and it is expected that seventy-five will be received by the closing date. This tour is to be a good roads boosting proposition and the majority of the entrants are private citizens of the South. In order to make the run more popular it is understood the Manufacturers' Contest Association will recommend the abolition of the stock car technical examination in conjunction with this run. This is being done in order to allow many private owners of unregistered stock cars to enter the tour.

Seven Clean Scores in Lake Tahoe Run

SAN FRANCISCO, Sept. 1—The hardest endurance run ever held in Northern California has just been completed. It was a four-day endurance test between this city and Lake Tahoe and return, a distance of 520 miles, a great deal of which is through the Sierra mountains, rising to a height of 7,000 feet. About two dozen cars took part in the run, but only fifteen of these were officially entered as contestants. Of these fifteen seven secured perfect scores, as follows: American "Fifty" driven by Stanley Gawne; Buick "26," driven by Claud McGee; Buick "30," driven by Fred E. Gross; Elmore "30," driven by Bruce W. Aurandt; Flanders "20," driven by Stanley Jonas; Franklin "18," driven by A. S. Chisholm (official pilot car); and Winton "Six," driven by Harry L. Owesney.

Preparing for Port Jefferson Climb

Sixteen events will make up the program of the Port Jefferson hill climb, which is scheduled for Saturday, September 9. De Palma's Fiat, which holds the present record of the course—20.48—will not be in evidence, although there will be no dearth of fast cars among the competitors. The work of resurfacing the hill and banking the elbow turn has been in progress for some time, and the prospects for cutting a liberal slice off the present figures are considered excellent.

Westcott Wins 200-Mile

COLUMBUS, OHIO, Sept. 3—A crowd variously estimated at between 25,000 and 28,000 attended the 200-mile automobile race held under the auspices of the Columbus Automobile Club at the Columbus Driving Park Sunday, September 3. The race was one of the most successful in the history of automobile racing in Ohio and several records on a dirt track were broken.

Lee Frayer in a Firestone-Columbus went one of the miles in 54 seconds flat, which is a record in a contest on a dirt track. The time of Harry Knight in a Westcott, who won the race handily, was 3:45.00 flat.

There were three cars which finished the 200 miles out of the eight starters. Jackson No. 2 car driven by Max Borst and entered by J. P. Adamson, the local Jackson dealer, finished in 4:15.00 flat, while Jackson No. 1 driven by John Borst, a brother of the other Jackson driver, finished just 1 minute later, the time being 4:16.00.

The starters in the race were: Jackson, driver John Borst, entered by J. P. Adamson; Jackson, driven by Max Borst, entered by J. P. Adamson; Cino, driver William Fritsch, entered by Haberer & Company; Ford, driver W. G. Lake, entered by Ohio Auto Sales Company; Marquette-Buick, driver Frank Lawwell, entered by Leyman Buick Company; Wescott, driver Harry Knight, entered by the Wescott Motor Car Company; Firestone-Columbus, driver Lee Frayer, entered by Lee Frayer; Cole, driver G. Morris and John Jenkins, entered by Cole Motor Car Company.

The race was a sweepstakes with the purse of $1,000 divided into three moneys, viz., first money, $500; second money, $300; third money, $200. In addition the winners of the first three places received valuable trophies in the shape of loving cups.

The start of the race was made at 1:40 p. m., with the cars going at an estimated speed of 30 miles per hour. The lead was at once taken by Leo Frayer in the Firestone-Columbus, who kept it until the eighty-sixth mile when the car skidded while making a curve and went through a fence. Frayer was pinned under the car and was taken out after some trouble. He was not seriously injured and is expected to be around in a few days. The car was put out of commission by the accident which cannot be accounted for by Frayer.

The Westcott car driven by Harry Knight then took the lead and held it until the end. The car was never in danger and was compelled to stop only twice during the 200-mile race. The first stop was made after the car had made 114 miles and was for gasoline and oil; another stop was made later for one tire.

The Cino, driven by William Fritsch, only made 14 miles before it was compelled to leave the track because of magneto trouble. At the end of the thirty-first mile the Ford car, driven by W. G. Lake, was compelled to leave because of trouble with the water cooling system. The Cole entrant, driven by John Jenkins was compelled to leave at the end of the seventy-third mile because of engine trouble.

The accident that put the Firestone-Columbus car out of commission occurred at the end of the eighty-sixth mile on a bad turn in the track. The Marquette-Buick when in second place at the end of the 198th mile threw a tire and skidded into the inside fence. Frank Lawwell had given away to William Fritsch and Ben Lawwell was acting as mechanician. The latter was thrown high in the air but escaped serious injury and Fritsch was not scratched at all.

The winner of the race, Harry Knight, made the sixth mile of the distance in 58 seconds flat, which was his fastest mile.

24-Hour Race Announced for Brighton

During the running of the races at Brighton Beach on Monday, it was announced that application had been made to the Contest Board for a sanction for a 24-hour race to be held on that track between September 23 and 30. According to the announcement ten entries have been made.

More than two-score automobiles at one of the checking stations of the 100-mile Farmers' Sociability Run, at Kalona, Ia.

Farmer's "Sociability" Run

One of the greatest advantages of the auto on the farm is the sociability it affords, and the farmers are finding out that the automobile is fast doing away with the isolation and disadvantage of farm life. It is also encouraging the young folks to remain on the farm and putting a stop to the influx to cities.

In this connection, it is of interest to learn that forty-three farmers of Kalona, Iowa, have just completed what is said to be the first "Sociability" run ever held by farmer motorists. The tour covered 100 miles, starting at Kalona. The route led through Washington, Brighton to Richland and return. Not a single one experienced any mechanical trouble, which added greatly to the pleasure of the trip.

When it is remembered that these forty-three farmers all live in the same locality some idea is gained of the extent to which farmers are purchasers of automobiles. In this particular instance every car used in this run was the "Dreadnought" Moline.

Transcontinental Truck Arrives on Coast

San Francisco, Aug. 26—The first half of a most remarkable motor truck test was completed yesterday, when the Packard three-ton truck arrived here from New York. While this is not the first time that a motor truck has crossed the continent, it is the first instance that such a test has been made a day-to-day affair. The time of the Packard was forty-six and a half days from the time the big truck started from New York. The number of days that the Packard was actually on the road was forty-one, the other five and a half days being spent in the larger cities along the route.

The car is in charge of W. T. Fishleigh, body engineer of the Packard Motor Car Company. Accompanying him are E. L. Burnett and A. Haener, of the experimental department of the Packard Company.

Small Fields at Gearhart Beach

Tacoma, Wash., Sept. 2—Over 2,000 enthusiasts witnessed the races at Gearhart Beach on August 26. In the first race a Locomobile, driven by C. A. Barstow, won, covering the distance in 5 minutes 26 seconds. D. C. Reynolds, in a Pierce-Arrow, was second. The only other entry failed to finish. Carl R. Gray, president of the Hill lines in Oregon, presented a cup to the winner.

Robert Bearce, driving a Marion, won the second race in 5 minutes and 48 seconds. George Crab, in a Warren-Detroit, was second, and F. W. Perkins, driving an Overland, third. The race was for the Astoria Centennial Cup.

The third race was a handicap event and was captured by D. C. Reynolds in his Pierce-Arrow in 5 minutes and 30 seconds. C. A. Barstow, in a Locomobile, was second and Robert Bearce, driving a Marion, third. The Gearhart Hotel presented the winner with a cup.

The number of entries in the three races scheduled were not as many as the committee had anticipated.

Velie Stars at Pottstown

Pottstown, Pa., Sept. 2—The annual fair of the Montgomery County Fair Association was brought to a successful termination to-day by an afternoon of automobile racing conducted by the South Jersey Motor Club, the meet attracting more than 5,000 persons.

Interest centered in the attempt to lower the existing record for the mile circular track of 1 minute 2 1-5 seconds, hung up by the Mercer car last year, Harvey Ringler driving. William Mullin turned the track, clipping 1 1-5 seconds from the mark, negotiating the circuit in 1.01.

The carded events were five and ten-mile races in which Philadelphia pilots shone. Notwithstanding the fact that rain had continuously fallen for the preceding week or more and the sun had not put in an appearance until Friday, the track was in fine shape and the average time of the winners good. The fastest time made during the day was in event No. 6, won by the Velie car in 5.26 1-5 for the five miles, while the slowest was in th esecond event, 11.57 for the ten miles being the time taken by the Mercer car driven by Ringler.

Practically the same cars and drivers will take part in the races at Salem, N. J., on Labor Day. Summaries:

Ten miles, 161 to 230 cubic inches

Position.	Car.	Driver.	Time.
1.	Abbott-Detroit.	V. Padula	11:50
2.	Regal.	F. N. Snader.	12:34
3.	Metz.	H. B. Baker.	....

Ten miles, 231 to 300 cubic inches

1.	Mercer.	Harvey Ringler.	11:57
2.	Klinekar.	Bob Morton.	12:58⅛
3.	De Tamble.	G. H. Hambly.	....

Ten miles, 301 to 450 cubic inches

1.	Velie.	J. W. Davis.	11:38⅜
2.	Fiat.	Sig. Isenberg.	12:04

Ten miles, 161 to 230 cubic inches

1.	Regal.	F. N. Snader.	....
2.	Metz.	H. B. Baker.	....

No race, cars called off at end of second lap.

Five miles, special match race

1.	Velie.	J. W. Davis.	5:26⅛
2.	Klinekar.	Bob Morton.	5:31⅝

Special handicap race for winners; ten miles

1.	Velie (hdcp. 30 sec.)	J. W. Davis.	11:30
2.	Abbott-Detroit (hdcp. 1 min.)	V. Padula	11:57
3.	Simplex (scratch).	William Mullin.	....
4.	Regal (hdcp. 1 min. 6 sec.)	F. N. Snader.	....
1.	Klinekar (hdcp. 30 sec.)	Bob Morton.	5:33
2.	Abbott-Detroit (hdcp. 10 sec.)	V. Padula.	6:17⅝

Sued for Appropriating Gasoline

Akron, Ohio, Sept. 4—Automobilists of Ohio and Michigan who have had occasion to ship their cars by boat either from Cleveland to Detroit or vice versa are up in arms over what they declare to be unfair treatment they have been receiving from the Detroit & Cleveland Navigation Company. When autos are run aboard D. & C. steamers at either end of the line the gasoline is of course drained from their tanks, in compliance with a marine fire insurance regulation. Arriving at the other end of the line an arbitrary rule is enforced, by which the boat company replaces only three gallons at the Cleveland end or five gallons at Detroit. Sometimes as much as twenty-five gallons are taken from tanks at the beginning of the run, and autoists have naturally felt that they had room for complaint, but their objections have thus far brought no revision of the rule. B. P. Foster, a Cleveland manufacturer and member of the Cleveland Automobile Club, who claims that on several occasions he was relieved of much more gasoline than was returned to him, has authorized his attorneys to begin suit against

the D. & C. Company for the difference between the gasoline taken and the gasoline returned, or its equivalent in money. It has been estimated that the company has already benefited to the extent of thousands of gallons of gasoline by its rule.

Big Month for Winnipeg Motorists

WINNIPEG, MAN., Sept. 2—The automobile racing enthusiasts of Western Canada will have their speed hunger appeased on Saturday, September 16, when the annual Fall race meeting of the Winnipeg Automobile Club will be held on the mile track at Kirkfield Park.

In addition to the track races the endurance run to determine next year's holder of the Oldsmobile trophy will be held September 29-30. This contest is held over a central Manitoba course of 455 miles, which includes roads of every variety. Some forty starters are expected to compete.

The race card for the Kirkfield Park meet includes the following events:

Ten-mile race, for stock cars up to 160 inches piston displacement.
Ten-mile race, for stock cars from 161 to 230 cubic inches displacement.
Ten-mile race, for cars from 231 to 300 inches displacement.
Ten-mile race, for stock cars, 301 inches displacement and over.
One-mile open attempt for record.
Five-mile open race for stripped cars.
Dunlop trophy race, 25 miles. Open to any car or driver resident in the province.
Ten-mile open race for stripped cars.

Records Stand at Scranton

SCRANTON, PA., Sept. 5—Five efforts to break the record of 1.08 for a mile on a half-mile track failed at the Minooka Driving Park yesterday, Ralph De Palma making the trial twice, and R. A. Ammerman, Eugene Cusick, and Willie Haupt each once.

De Palma made the best time in his giant Simplex, a mark of 1.11 being credited to him. Two accidents marked the afternoon's sport. Eugene Cusick, of Scranton, in his Buick, driving in the five-mile, non-stock, class "C" free-for-all against De Palma and Haupt, had a narrow escape from death when he collided with the fence at the upper turn. A fence rail pierced the radiator.

Harry Kaufman, in a Buick, in the first event, two miles, non-stock, Class "C," likewise ran into the fence.

A crowd of 5,000 witnessed the races, which were under the auspices of the Scranton Racing Association. Summaries:

Event No. 1—Two Miles

Pos.	Car.	Driver.	Time.
1	Buick	Ralph Ammerman	2:57
2	E-M-F	William Krise	

Event No. 2—Three Miles

1	Mercer	Ralph De Palma	4:30

Event No. 3—Three Miles

1	National	Willie Haupt	4:09⅕
2	Buick	Tom Jacobs	

Event No. 4—Trial to Break Mile Track Record on Half-Mile Track

	Simplex	Ralph De Palma	1:11

Event No. 5—Five Miles

1	Mercer	Ralph De Palma	7:54⅘
2	Buick	Ralph Ammerman	
3	Buick	David Birtley	

Event No. 6—Exhibition Mile

	Buick	Eugene Cusick	1:21

Event No. 7—Amateur, Three Miles

1	Buick	Dr. E. F. McGinty	4:41⅕
2	Buick	Joe Wills	

Event No. 8—Non-Stock, Class C, Free-for-All, Five Miles

1	Simplex	Ralph De Palma	6:39
2	National	Willie Haupt	

Event No. 9—Exhibition Mile

	Buick	Ralph Ammerman	1:20⅕

Event No. 10—Non-Stock, Class E, Free-for-All Handicap, Five Miles

1	Simplex	Ralph De Palma	

Event No. 11—Exhibition Mile

	National	Willie Haupt	1:16⅘

Event No. 12—Non-Stock, Class C, Free-for-All Handicap, Three Miles

1	Simplex	Ralph De Palma	3:41⅘
2	National	Willie Haupt	
3	Buick	Ralph Ammerman	

Event No. 13—Exhibition Mile

	Mercer	Ralph De Palma	1:17⅕

Record Crowd at Amarillo

AMARILLO, TEX., Sept. 5—The two-day race meet came to a close this afternoon in a highly sensational manner, when Carl Reeves, of Midland, Texas, driving a National "40" wrecked his car while going at a rate somewhat more than 70 miles an hour, caused by striking a soft earth roll at the inner line of the track. The machine was torn almost part from part, but one wheel retaining its spokes. The driver was thrown entirely across the track, sustaining a scratched elbow and bruised hip.

The first race of the afternoon was thirty miles, won by Staver-Chicago, driven by Nikrent, in 28 minutes and 27 seconds; second, Staver-Chicago, driven by Monckmeier, 28 minutes, 43 seconds; third, E-M-F, driven by Johnson, 30 minutes and 36 seconds; fourth, Cadillac, driven by Mullins, 30 minutes 56 seconds.

The second race, at sixteen miles, was won by the E-M-F, driven by Johnson; time, 15 minutes and 55 seconds.

The 100-mile race was won by the National "40," driven by Wilcox; time, 96 minutes 56 seconds; second, Staver-Chicago, driven by Monckmeier, 103 minutes 15 seconds.

The 50-mile event went to the National "40," driven by Wilcox; time 46 minutes 59 seconds; second, Marmon, driven by Johnson. It was in this race that Reeves so narrowly escaped death.

On the first day the first event of twenty miles was won by the E-M-F 30, driven by Reeves, in 20 minutes 15 seconds, the Marion, driven by Day, finished second, and the Buick, driven by Tripplet, third.

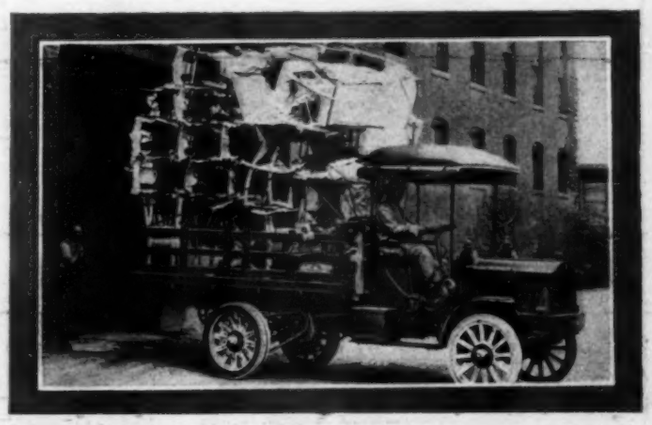
The second race, thirty miles, was won by Staver-Chicago, driven by Monckmeier, in 29 minutes and 6 seconds, with Staver-Chicago second and E-M-F, driven by Reeves, third.

The fourth race, at fifty miles, was won by a National 40, driven by Reeves, in 44 minutes and 37 seconds, with National 40, H. E. Wilcox, second.

Setting Dates for Show Banquets

Dates for the big show banquets are being made and already it has been announced that the annual dinner of the Motor and Accessory Manufacturers will be held on the evening of Thursday, January 11, at the Waldorf-Astoria. A big attendance is already assured.

Tentative plans are also in process of formation with regard to holding a big combined banquet of the exhibitors and officers of the Automobile Board of Trade show at the Garden and of the National Association of Automobile Manufacturers show at the Palace. The function will probably be staged at one of the big uptown hotels and the date will probably be Tuesday, January 9.



Showing the 1½-ton, 26.4-horsepower Packard truck delivering a huge load of furniture

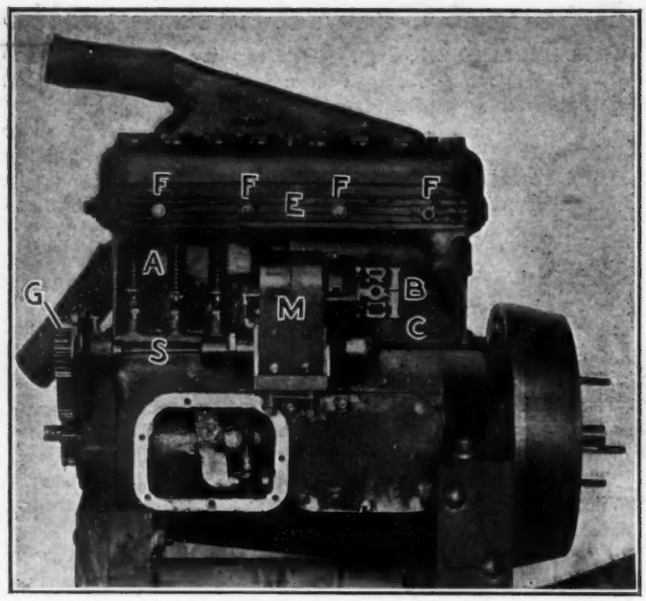


Fig. 1—Exhaust side of the motor with crankpit cover removed

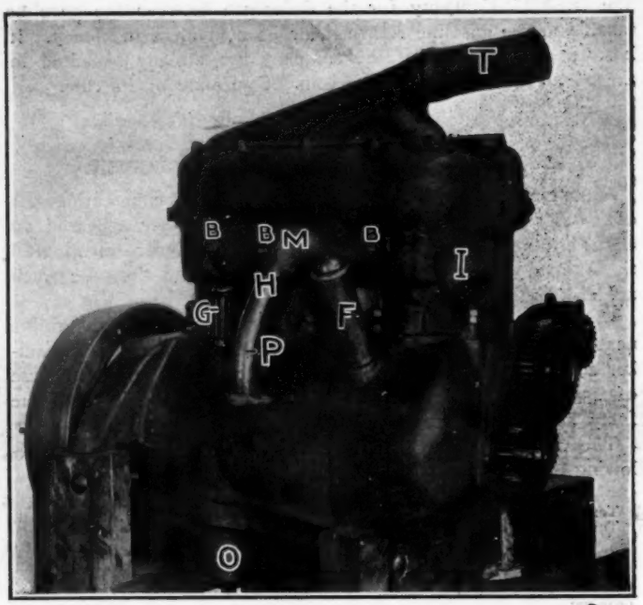


Fig. 2—General view of the right-hand side of the motor showing intake

New Entry to Gasoline Field

Hupp Corporation to Build Cars of That Type

A runabout type of automobile is now being manufactured by this concern, which has been known formerly by its activity in the electric field, through its production of the Hupp-Yeats. Other types of body will be added to the line as the business develops, and the cars produced will be known as the R. C. H., after the initials of the president of the corporation, R. C. Hupp.

THE announcement made by the Hupp corporation, of Detroit, Mich., during the first annual convention of this concern, brings to light the interesting fact that a new gasoline car known as the R. C. H. is about to find its way on the market. Heretofore this corporation has been known by the production of the Hupp-Yeats electric, to which it had confined its efforts.

Fig. 3—Showing the finished vehicle, known as Model F

It has been arranged at present to manufacture but one model —that being of the runabout type—and to add others as the business increases. This car will be known as Model F and has a rating of 22-horsepower, the body being of the completely enclosed torpedo type, with a seating capacity of two and a rear platform large enough for a tool box and a double rumble seat. The wheel base is 86 inches, the tread 56 inches and the tires 30 by 3 inches. The steering wheel is on the left and the change gear lever in the center, so that the car can be entered from either side. There is not any emergency brake lever; the gearbox is a unit with the rear axle.

The motor is of the long-stroke type, having a bore of three and one-quarter inches and a stroke of five inches; this is a ratio of 1 to 1.54. The cylinders are cast en bloc. The crankshaft revolves on two bearings, and the valve action, including the timing gears, is completely enclosed. In Fig. 1 the exhaust side of the motor is shown with one of the valve cover plates C removed. The action may be readily inspected by removing the bolt B, which holds this cover in place, and the crankpit may be examined by removing the inspection cover D. The exhaust manifold E is provided with air cooling flanges, and is held to the cylinder casting by means of four through bolts F, which terminate in bosses in the inner casting. The magneto M is driven by the shaft S, which is rotated by and connected to the gear G.

On the right side of the motor, Fig. 2, the carbureter is seen to be fitted within the base casting, the object being to preheat the mixture to insure vaporization. The short intake pipe P

is connected to the manifold M at H, the manifold being held to the cylinder casting by means of three studs, B. On this side of the engine the oil filler pipe F and the oil level glass G are located.

The cooling system is of the thermo-syphon type, with ample water jackets and fan in the flywheel. The intake is at I and the outlet at T. The radiator has a height of 23 inches and a width of 24 inches.

The lubrication is effected by means of the circulating splash system, the oil being maintained at constant level and circulated by means of a pump, the position of which is indicated by O, Fig. 2. The oil reservoir is in the lower part of the crankcase.

The clutch is of the cone type G, Fig. 5, with a self-contained thrust and an adjustable, grease-tight universal joint of hardened steel. A short shaft with a universal joint at each end connects the clutch with the forward end of the propeller shaft within the torsion tube, a considerable change in alignment being allowed by these joints. The propeller tube P is supported at the rear by the gearbox.

The gearset is of the three-speed, selective, spur-gear type, mounted on roller or plain bearings as specified by the purchaser. The gears are of chrome vanadium steel, and are hardened to prevent wear. The jackshaft and pinion shaft are of the same material as the gears. Upon the pinion shaft are mounted the sliding gears, which are held in position by four integral keys. The gearbox is divided vertically, so that the gears and shafts may be removed by simply unbolting the case. The rear half is integral with the axle housing.

The rear axle is of one-piece construction, with a cap at the rear which permits of the removal of the differential. Roller bearings support the differentials at either side and the thrust is taken by two ball bearings. The pinion and bevel gear are adjustable in both directions.

The steering gear, shown in Fig. 4, of the irreversible worm-sector type, is mounted on the left side of the frame. The steering wheel is 16 inches in diameter. The post is nclosd in a stationary black enameled tube. The right pedal R operates the external brake and the left pedal first disengages the clutch and then by a continuance of motion applies the internal brake, a slight forward motion of this pedal locking it in any desired position.

An accelerator pedal controlled by the right foot regulates the carbureter, and an adjustment just above the pedal determines the lowest speed possible when the foot is removed. The two brake rods extend from the control levers to the equalizers, located back of the axle, through the center of the chassis. This gives a concealed braking arrangement. The brake drums are 10 inches in diameter and 1 1-2 inches wide.

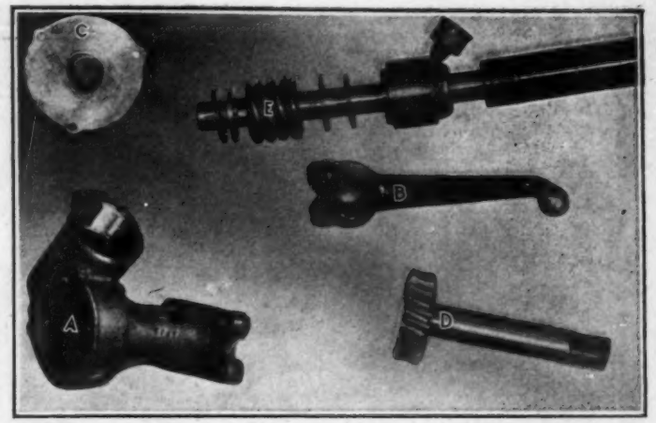


Fig. 4—Steering details: A, box; B, drop arm; C, cover; D, sector; E, shaft and worm

The front springs, 33 inches in length, one and one-half inches in width, are of the semi-elliptic form and are nearly flat. The rear springs, one and one-fourth inches in width and 37 inches in length, are of the elliptic style, tilted at the top toward the rear and hang under the axle. The passenger weight is well forward of the rear axle and the springs are mounted upon swivel seats to allow freedom under all possible conditions.

The equipment of the car is illustrated in Fig. 3, which shows the finished vehicle. It includes top, windshield, three oil lamps, two gas lamps, generator, horn and tool kit.

Tire Pointer for the Automobilist

A motorist may find that an inner tube has been injured and perhaps ruined from no apparent cause. Upon examination small holes will be found in its surface, the only logical reason for their presence being apparently poor tube material. This, however, is seldom the cause, says a Michelin expert, the real trouble lying with the motorist. He has carelessly fitted the tube allowing small particles of mud and dirt to enter the envelope, the air pressure from within the tube and the external pressure combining to grind the foreign matter into the tube.

When fitting a tire it is not enough to simply clean the envelope and tube. Care should be taken to admit no mud or sand during the operation. The tire levers should not be left lying on the ground as they will collect dirt which may find its way into the envelope.

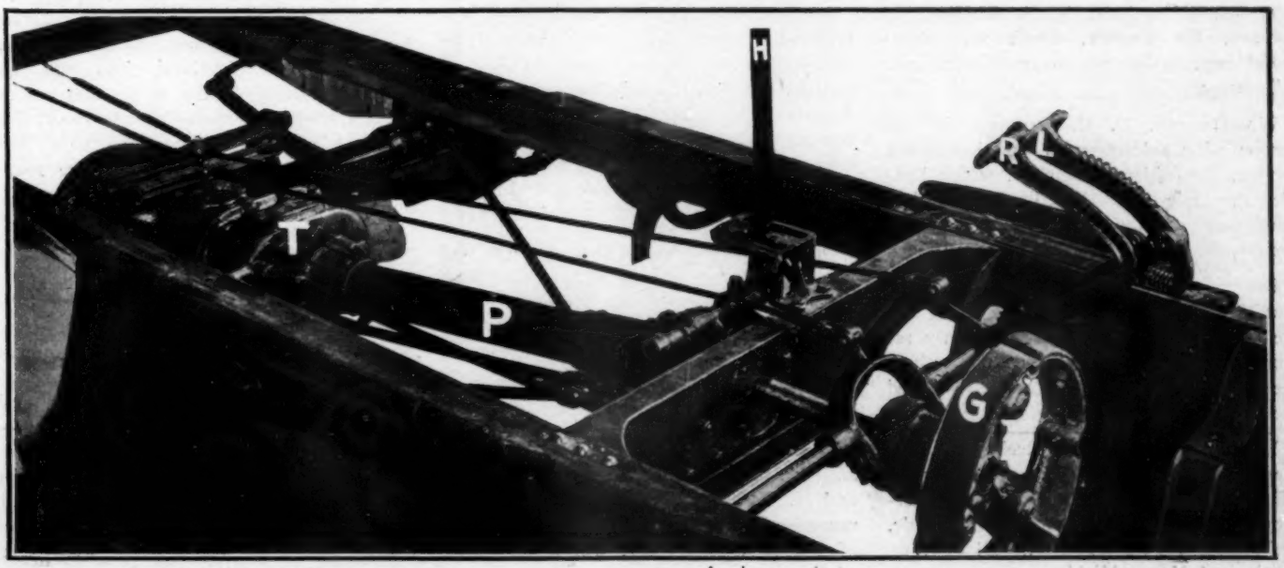


Fig. 5—View of rear end of chassis, showing clutch and transmission

NEWS of the WEEK CONDENSED

CHRISTCHURCH, N. Z.—New Zealand's latest dreadnought, illustrated above, is built in this country by the Willys-Overland Company, of Toledo. The squadron of Overland cars that are following the dreadnought are also products of the same factory. The picture, which was taken during the carnival precession in Christchurch, represents a single shipment of Overland cars consigned to the New Zealand Farmers' Co-operative Association.

LOUISVILLE, KY.—The Wilder Motor Car Company has acquired the agency for the Everitt car in Kentucky.

KENOSHA, WIS.—Benjamin F. Windsor, president of the Windsor Spring Company, died last week at the age of 52 years.

INDIANAPOLIS, IND.—The Finch & Freeman Auto Company, which handles the Auburn, De Tamble, Clark and Richmond cars, has moved to 519 North Capitol avenue.

WASHINGTON, D. C.—Pending the selection of a salesroom in the down-town section, the Wilson Company, which handles the Cole and Krit lines, has taken temporary quarters at 1018 Connecticut avenue, N. W.

BOSTON, MASS.—E. P. Blake, who handles the McIntyre trucks, is dickering for the Corbin agency which was recently relinquished by the White, Ware & Leatherbee Company. Mr. Blake has also added the Blake car to his line.

MILWAUKEE, WIS.—Al. Reeke has succeeded A. W. Shattuck as sales manager of the local branch of the Thomas B. Jeffery Company. His territory will include, besides Milwaukee, practically all of Wisconsin and Upper Michigan.

PHILADELPHIA, PA.—The Gawthrop & Wister Company has recently secured the agency for the Brush car in the Quaker City.

MILWAUKEE, WIS.—The Smith-Hoppe Auto Company has completed arrangements for handling the Oakland car in Milwaukee and vicinity.

AKRON, OHIO.—The Miller Rubber Company has bought attractive land on the Manchester road in Kenmore, near here, to give room for factory expansion.

INDIANAPOLIS, IND.—One hundred employees of the Maxwell-Briscoe Motor Company have purchased 26 acres of land at Newcastle, Pa., upon which they will build cottages for their own use. The price paid for the land was $500 an acre, the entire amount having been subscribed by the factory employees.

RACINE, WIS.—The Mitchell-Lewis Motor Car Company has filed articles of incorporation for four branch houses, at Seattle, Atlanta, Kansas City, and Philadelphia. The capital stock of each of the companies is $10,000, and the incorporators in each instance are the same—C. A. Armstrong, G. V. Rogers and F. L. Mitchell.

BOSTON, MASS.—The Jackson car will hereafter be handled in the Hub through the agency of a factory branch, a company having been incorporated under the title of the Jackson Motor Car Company, of Massachusetts, with H. A. Matthews, treasurer of the Jackson Company in Michigan, as president. M. H. Bates, who formerly handled the car in Boston and Brockton, has been made treasurer, and J. L. Judd secretary and general manager. Ira Russell, formerly foreman of the Jackson factory, will have charge of the repair department.

BOSTON, MASS.—The Lowe-Howard Company, agent for the Krit and Correja cars, is preparing to give up the motor business. When the stock is disposed of the company will dissolve. The Krit line has been taken on by Willard M. Jenkins, who handles the Mitchell and Abbott-Detroit, in Boston.

OMAHA, NEB.—On account of the large number of Omaha dealers who desire to exhibit their cars at the Nebraska State Fair, the third annual endurance run of the Omaha Motor Club, which was originally scheduled for September 6-9, from Omaha to North Platte and return, a distance of 750 miles, has been postponed for a week, the new date being September 12-15.

FINDLAY, OHIO.—There is some trouble in conjunction with the present receivership of the Norwalk Motor Company. H. L. Stewart, who was appointed receiver by Judge Lee, has been succeeded by A. J. Schurr, of Cleveland, who was appointed by Judge Killits, at the instance of certain creditors. Some of the stockholders are now endeavoring to have Mr. Schurr removed and Mr. Stewart reappointed.

LOUISVILLE, KY.—Kentucky and Tennessee automobile dealers—120 strong—boarded a special Pullman train last Wednesday and went to Detroit where they were the guests of the Studebaker Corporation for two days. They made merry at luncheons, dinners, theatre parties, automobile rides and excursion trips and inspected the E-M-F and Flanders factories. W. W. Beeson, of this city, was in charge of the Kentucky delegation, which numbered fifty-four. The remainder of the dealers were from Tennessee and in charge of E. H. Jacoby, the Studebaker representative at Memphis.

WINNIPEG, MAN.—Last week 202 orphans of Winnipeg were treated to their annual automobile ride by members of the Winnipeg Automobile Club. They enjoyed a full day's outing with picnic and a programme of juvenile sports thrown in. Sixty cars were donated for the occasion.

BOSTON, MASS.—The Boston Automobile Dealers' Association is out with a booklet containing its preliminary announcement of the Tenth Annual Show, to be held in that city during the week of March 9-12, 1912. The booklet contains the rules and regulations governing the application for and allotment of space, including floor plans of Mechanics' Building and the necessary blanks.

INDIANAPOLIS, IND.—The Indianapolis Trade Association will make its ninth trade extension trip September 26 and 27. A special train will be used and about 150 members of the association and a brass band will make the trip, visiting retail dealers and distributing advertising matter. On the evening of the 26th the Fort Wayne Commercial Club will be host for the party. Places to be visited include Royerton, Shideler, Eaton, Hartford City, Montpelier, Keystone, Poneto, Bluffton, Kingsland, Ossian, Fort Wayne, Decatur, Monroe, Berne, Geneva, Briant, Portland, Ridgeville, Winchester, Lynn, Fountain City and Richmond.

CINCINNATI, O.—The second establishment representing Cincinnati automobile interests will soon be in operation in Canada—the pioneer having been the Schacht Company. The invader this time is the Ohio Motor Car Company, whose president and general manager, Charles F. Pratt, is now in Canada on a tour of inspection. He will probably locate and effect arrangements for the new plant to be in active working order in the very near future. Vice-President Schafer confirmed the report in regard to the mission of President Pratt and stated it had become almost a necessity by reason of the large and increasing Canadian business of the company.

NEW YORK CITY—The new United States Rubber Company building, now being erected at Broadway and Fifty-eighth street, was projected primarily to afford adequate quarters in a convenient uptown location for the main offices of the United States Rubber Company, as well as selling space in the automobile district for the United States Tire Company. The latter will occupy the store, with storage space beneath, while the United States Rubber Company will occupy the upper portion of the building.

The arrangement of offices is such that any number of offices may be thrown together, en suite, so as to meet any possible demands for floor space.

The construction of the building is in accordance with the best present day practice and particular attention has been paid to the methods of fireproofing. The foundations of the building are fully waterproofed.

The mechanical equipment of the building includes complete independent heating plant with vacuum circulation, complete standpipe equipment for fire protection, vacuum cleaner plant for the entire building and electrically operated elevators of the gearless traction type.

Each floor contains approximately 6,300 square feet, if undivided. Subdivided, each floor provides seventeen offices, varying from the smallest single office of 280 square feet to the largest single office, 630 square feet.

United States Rubber Company building now being erected in New York City

SYRACUSE, N. Y.—Entries for the second annual Watson Cup run are pouring into the office of the Automobile Club of Syracuse, assuring the promoters that a record field will get away in the tour to Koenig's Point next week in competition for the handsome silver goblet presented to the club by B. F. Watson. The contestants are to leave the city at 8:30 a. m., driving to Koenig's Point, on Owasco Lake, where dinner will be served. The committee will award the $100 trophy to the contestant coming nearest the secret time. The club also offers a silver trophy to the woman driving her own car who comes nearest to the secret time.

Automobile Incorporations

AUTOMOBILES AND PARTS

ALBANY, N. Y.—Mohawk Valley Automobile Co.; capital, $5,000; to make automobiles. Incorporators: Wm. E. Milbank, Agnes G. Waldron, Frank S. Weis.

COLUMBUS, OHIO—Toledo Annealing Charging Truck Mfg. Co.; capital, $10,000; to manufacture freight automobiles. Incorporator: John J. Blum.

DETROIT, MICH.—Lozier Motor Co., increased its capital from $2,000,000 to $3,000,000.

GROVE CITY, PA.—Bessemer Motor Truck Co.; to manufacture automobile trucks. Incorporators: I. N. Lewis, J. E. Marquis, E. J. Fithian, L. M. Monroe, A. N. Allen.

HACKENSACK, N. J.—American Automobile Co. of Philadelphia; capital, $50,000; to build motor cars. Incorporators: Ralph D. Earle, Geo. M. Brewster, John R. Ramsey, Wendell J. Wright.

HENDERSON, N. C.—Corbitt Automobile Co.; capital, $250,000; to make automobiles. Incorporators: R. J. Corbitt, D. Y. Cooper, J. B. Owen.

INDIANAPOLIS, IND.—Fisher-Gibson Co.; capital, $50,000; to manufacture automobiles and accessories. Incorporators: Carl G. Fisher, Cecil E. Gibson, Will J. Dobyns.

JERSEY CITY, N. J.—Marquette Co.; capital, $10,000; to manufacture automobile motors. Incorporators: B. S. Mantz, H. A. Black, John R. Turner.

LANSING, MICH.—American Motor Castings Co.; increased capital from $200,000 to $250,000.

MARTINSBURG, W. VA.—Norwalk Motor Car Co.; capital, $300,000; to manufacture and sell automobiles. Incorporators: F. A. Minor, Gray Silver, S. P. Hopkins, H. L. Alexander, T. W. Martin, G. W. McKown, Leon H. Ware.

NEWARK, N. J.—E-M-F and Flanders Newark Sales Co.; capital, $10,000; to sell pleasure cars.

NORFOLK, VA.—Coburn Motor Car Co., Inc.; capital increased from $10,000 to $50,000.

PITTSBURGH, PA.—Lang Motor Truck Co.; capital, $25,000; to build freight automobiles. Incorporators: Edward L. Atkinson, Elias Lang, Rupert L. Border.

PORTLAND, ORE.—Braly-Dubois Auto Co.; capital, $5,000; to handle automobiles. Incorporators: J. C. Braly, D. S. Dubois, Russell E. Sewall.

AUTOMOBILE GARAGES, ACCESSORIES, ETC.

AKRON, OHIO—Standard Tire Protector Co.; capital, $50,000; to make tire protectors. Incorporators: H. M. Coulter, B. O. Barber, O. J. Ballender, D. J. Kooneo, H. A. Lane.

ATLANTA, GA.—Mitchell Motor Co.; capital, $10,000; to sell automobiles. Incorporators: C. A. Armstrong, G. V. Rogers, F. L. Mitchell.

CHARLESTON, S. C.—King Automobile & Repair Co.; capital, $5,000; to buy, sell and repair motor vehicles. Incorporators: W. A. King, S. B. King, Jr., R. M. Lofton.

CINCINNATI, OHIO—Hayes & Havons Co.; capital, $15,000; to operate a garage and rent automobiles. Incorporators: Gus L. Hayes, Geo. C. Kuhn, C. F. Havons, Louis M. Pink, Leo. R. Wise.

CLEVELAND, OHIO—Eagle Lubricant Mfg. Co.; capital, $25,000; to make lubricating oils and grease. Incorporators: Chas. F. Maybery, James Graham, F. M. Potter, J. R. Ferguson, Oscar L. Tafe.

DAYTON, OHIO—Air Friction Carbureter Co.; increased capital from $10,000 to $20,000.

KANSAS CITY, MO.—Mitchell Motor Co.; capital, $10,000; to sell automobiles. Incorporators: C. A. Armstrong, G. V. Rogers, F. L. Mitchell.

LIMA, OHIO—Lima-Overland Co.; capital, $10,000; to sell automobiles and accessories and conduct a garage. Incorporators: Samuel Roeder, Howard W. Pears, George E. Bayley, Leo Roeder.

NEW ORLEANS, LA.—Kreher Auto Co.; capital, $10,000; to sell automobiles. Incorporators: Charles Kreher; Bertha Kreher.

PHILADELPHIA, PA.—Mitchell Motor Co.; capital, $10,000; to sell automobiles. Incorporators: C. A. Armstrong, G. V. Rogers, F. L. Mitchell.

PITTSBURGH, PA.—Mutual Wind Shield Co.; capital, $25,000; to make wind shields and accessories. Incorporators: A. J. Kraber, Geo. F. Ferrier, Lorry Poffenberger.

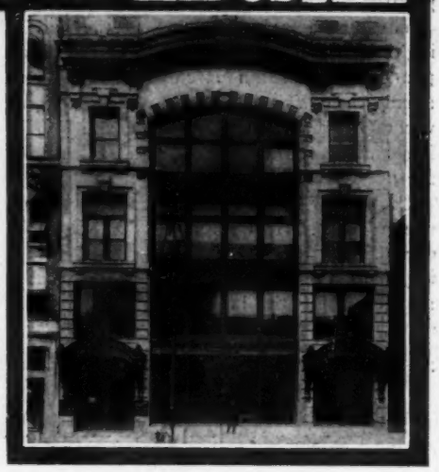
PORTLAND, ORE.—Auto Painting & Exchange Co.; capital, $25,000; to do a general business in automobiles. Incorporators: John Dumbell, Winnie Fleetwater, Henry O. Proebstel.

SEATTLE, WASH.—Mitchell Motor Co.; capital, $10,000; to sell automobiles. Incorporators: C. A. Armstrong, G. V. Rogers, F. L. Mitchell.

ZANESVILLE, OHIO—Zanesville Central Delivery Co.; capital, $10,000; to conduct a delivery business. Incorporators: E. B. Wadley, H. L. Garrett, B. V. L. Slack, William A. Frost, S. H. Sturts.

OF INTEREST to the INDUSTRY

PHILADELPHIA—The United States Motor Company has purchased the salesroom and service building at 216-218-220 North Broad street, formerly occupied by the Packard Motor Company. The building is one of the show places of the automobile trade of Philadelphia. Immediate possession will be taken by the United Motor Philadelphia Company, which is the Quaker City branch of the United States Motor Company. It will become the home of the Columbia-Knight and Maxwell cars as well as Sampson freight and delivery motors. All departments will be enlarged, furnishing room for all the models sold by the branch. The floor space will be four times as great as in the present location at 207 North Broad street. The enlargement of all departments will be made immediately and a full line of parts for all the company's cars will be carried in stock in a spacious parts department. The repair department will embody a main shop 200 x 50 feet, and another floor of equal size will be available for the storage of finished repair work. The maintenance of Sampson trucks will be conducted on another floor.



Philadelphia home of the United States Motor Company

ZIONVILLE, IND.—Marion & Stutz will represent the Cole line in this city during the coming twelvemonth.

PITTSFIELD, MASS.—The Cortland Motor Wagon Company is removing its plant from Cortland, N. Y., to this city.

SYRACUSE, N. Y.—The J. H. Valentine Motor Car Company has taken on the Syracuse agency of the Paige-Detroit.

EVANSVILLE, IND.—Harry P Mammen, of this city, has been appointed sales manager for Cole cars in Eastern Indiana and Western Ohio.

ST. LOUIS, MO.—The General Motor Car Company, 3952 Olive street, has been appointed Missouri distributor for the Cole car for 1912.

WASHINGTON, D. C.—An agency for the Stutz car has been established in this city by J. H. Ebersole at 1521 Fourteenth street, N. W.

READING, PA.—The Park Garage, which handles the Cole line in this city, has moved to new quarters at Eighteenth street and Perkiomen avenue.

CLEVELAND, OHIO.—The Standard Welding Company will open a branch office in the Ford Building, Detroit, Mich., September 11, with C. E. Miller in charge.

DETROIT, MICH.—The district representation of the Westcott cars in Michigan, Northern Indiana and Northern Ohio, will in the future be looked after by A. K. McCluny, with headquarters in this city.

LOUISVILLE, KY.—The United States Tire Company will open a wholesale branch at 904-906 South Third avenue, with H. G. Moesta in charge.

MILWAUKEE, WIS.—The Schreiber Motor Car Company has been appointed general distributor of the Stegeman motor truck for Wisconsin and the Central Western States.

MILWAUKEE, WIS.—G. P. Hewitt, former manager of the Buick branch in this city, has been appointed district manager of the Westcott Company in Minnesota, Wisconsin and Iowa.

TACOMA, WASH.—George A. Stewart, formerly sales manager of the Pacific Car Company, has been appointed district manager for the Everitt Northwest Company, with headquarters in Tacoma.

DES MOINES, IA.—H. B. Groves, manager of the United Motors Des Moines Company, has resigned. He will devote his interest to the Interstate Supply Company, of Sioux City, of which he is owner.

NEW YORK CITY.—C. F. Splitdorf has opened a branch office in Kansas City, Mo., at 1823 Grand avenue. E. A. Kelley, who for some years has had charge of the firm's San Francisco business, will be at the head of the new branch.

SEATTLE, WASH.—C. G. Arnold, formerly connected with the New York agency of the Pope-Hartford, and with the Keats Auto Company, of Portland, Ore., has become manager of the Olympic Motor Car Company, of Seattle.

INDIANAPOLIS, IND.—R. P. Henderson, formerly sales manager of the Parry Buggy Company, has assumed the vice-presidency of the Henderson Motor Sales Company, general agents for the Cole. Mr. Henderson is a brother of Charles P. Henderson, general manager of the Henderson Company.

LOUISVILLE, KY.—The Racine Auto Car Company, formerly located at 647 South Fourth avenue, has moved its salesroom and offices to Third avenue near Breckenridge street.

INDIANAPOLIS, IND.—The Empire Motor Car Company has decided to invade Japan, an agency having been established in that country with T. Laffin, of Yokohama, in charge.

PHILADELPHIA, PA.—The Jackson-Marion Sales Company, at 634 North Broad street, has closed a contract for the local representation of the Stutz car for the coming year.

TACOMA, WASH.—Having recently acquired the agency for the White cars in Southwestern Washington, J. F. Hickey has established the White garage at 750 South C street.

ATLANTA, GA.—The Long-Henderson Company, 226 Peachtree street, Cole distributors in the southeastern section of the United States, has changed its name to the Cole Motor Company, of Georgia.

CLEVELAND, OHIO.—The actual working force of the Peerless Motor Car Company now numbers over 2,200, not including office employees or executives. A number of departments are working day and night.

BROOKLYN, N. Y.—E. J. Montigny has closed a contract with the Abbott Motor Company of Detroit, Mich., as wholesale and retail distributor for the city of Brooklyn and Long Island. He has organized a company for the purpose of carrying on the business.

RICHMOND, IND.—The Westcott Motor Car Company has announced that the selling arrangements with the Henderson Sales Company of Indianapolis have been cancelled. Henceforth the sales of the Westcott will be handled from the factory, and an independent sales organization will be built up throughout the country.

BOSTON, MASS.—Morton H. Luce, forer manager of the Boston Velie branch, will shortly assume the management of the company's Chicago branch, handling the sale of pleasure cars and trucks in Illinois, Wisconsin, Michigan, Indiana and Ohio. The Velie interests in New England will in the future be looked after by Harold D. Bornstein of the Boston branch.

DETROIT, MICH.—The Universal Motor Truck Company has appointed the Lindsay Motor Company, 3327 Locust street, distributors for the St. Louis territory. The Hodgins-Fosdick Motor Company, Inc., Chalmers dealers at Spokane, Wash., have taken on the agency for these trucks in Eastern Washington. Thomas Black will look after the interests of these vehicles in Winnipeg, Manitoba.

CAR TRUCK—Being a form of suspension for motor vehicle loads.

2. The patent covers a car truck (Fig. 1) having a frame with side bars, links pendant from the side bars and rigidly connected therewith, springs supported by said links, a cross bolster, longitudinally extending equalizing bars and means for pivotally supporting the bolster on the equalizing bars and the latter on the springs.

No. 1,000,480—To Walter S. Adams, Philadelphia, Pa., assignor to the J. G. Brill Co., Philadelphia, Pa. Granted August 15, 1911; filed May 19, 1909.

CARBURETER—Containing such features as prevent flooding of the carbureter while operating.

2. This patent relates to a type of carbureter (Fig. 3) having an enclosing casing in which the float chamber and a fuel valve casing are contained and which has an air inlet and a mixture outlet, means being provided to keep the fuel in the float chamber at the desired level. A valve rotatably mounted within the valve casing; the valve has a port adapted to register with an elongated slot communicating with the float chamber below the fuel level, and this slot and the port are adapted to communicate by means of a fuel passage. Through this connection the fuel flows from the float chamber, being received by a cup-shaped member below the slot, the cup projecting above the fuel level existing in the float chamber, which arrangement prevents the carbureter from being flooded.

No. 1,000,518—To John Harris, Cleveland, O. Granted August 15, 1911; filed September 8, 1908.

STORAGE BATTERY AND PROCESS OF TREATING SAME—Specifies the constructive elements of an accumulator and chemical treatment therefor.

This patent protects the application of electrolytically active finely divided iron, or some other metallic material, intimately associated, with bismuth or bismuth amalgam. The process of treating the active metallic material consists in soaking the pockets containing it in a solution of bismust trichloride in acetone.

Thomas A. Edison, Llewellyn Park, Orange, N. J., assignor to Edison Storage Battery Co., West Orange, N. J.; granted August 8, 1911; filed March 20, 1908.

STARTING DEVICE—Being a safety crank for starting internal combustion engines.

In Fig. 2 is shown the cranking mechanism consisting of a rotatable element or shaft, encircled by a coiled spring which in turn is encircled and connected to a sleeve, the spring having a ratchet disc connected to one of its ends. The sleeve is encircled by a second spring to which is connected a rotatable member and this to a stationary one, the latter carrying a pawl which engages the ratchet disc above mentioned.

No. 1,001,303—To Samuel T. Reeves, Albany, Wis. Granted August 22, 1911; filed September 26, 1910.

RESILIENT VEHICLE TIRE—This is a tire to supplant pneumatics for automobile uses.

4. The patent covers a vehicle tire comprising a case tube formed with corrugations on its inner portion and split at its inner periphery. There are provided resilient walls having recesses open at their inner sides and forming a series of rounded cavities with the corrugations above mentioned. These cavities take up resilient balls which lend to the tire its elastic feature.

No. 1,000,165—to John B. Fischer, Chicago, Ill.; granted August 8, 1911; filed October 14, 1910.

DRIVING MECHANISM—Being of the friction wheel type.

3. The patents protect the combination, in a friction transmission, of a pair of opposed friction discs, a pair of friction wheels between the discs on a fixed common axis and means to bring the two wheels simultaneously into contact with opposite discs and on opposite sides of the disc axes.

No. 1,000,632—To Wilson Sprague, Portland, Me. Granted August 15, 1911; filed July 1, 1909.

GRINDER—Being a device for fitting valves in their places.

2. The valve grinder comprises a valve-engaging tool, a spiral shaft, an automatic clutch mounted on same, and actuator embracing the shaft, means for operating the actuator, including an adjustable crank, a momentum wheel on which the crank is mounted and transmission devices for operating the wheel mentioned and thereby the rest of the mechanism.

No. 1,000,553—To Peter Recconi, San Francisco, Cal. Granted August 15, 1911; filed February 23, 1911.

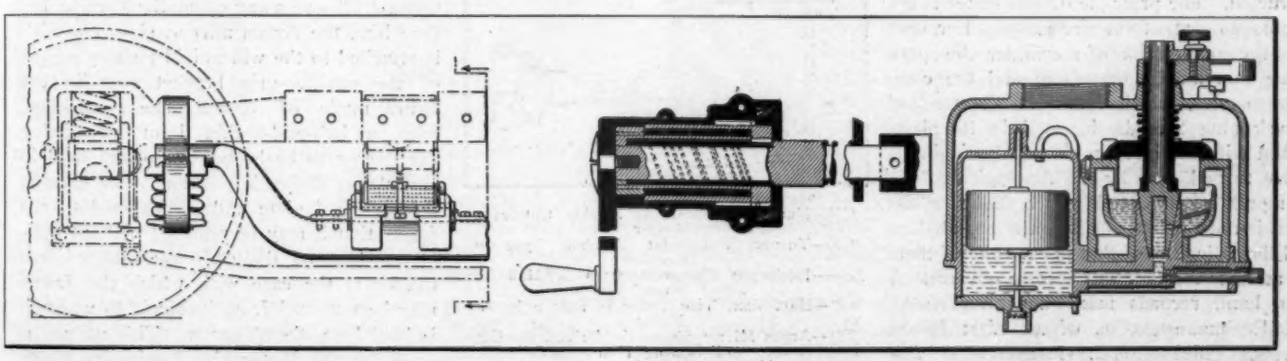


Fig. 1—W. S. Adams' car truck

Fig. 2—S. T. Reeves' starting crank

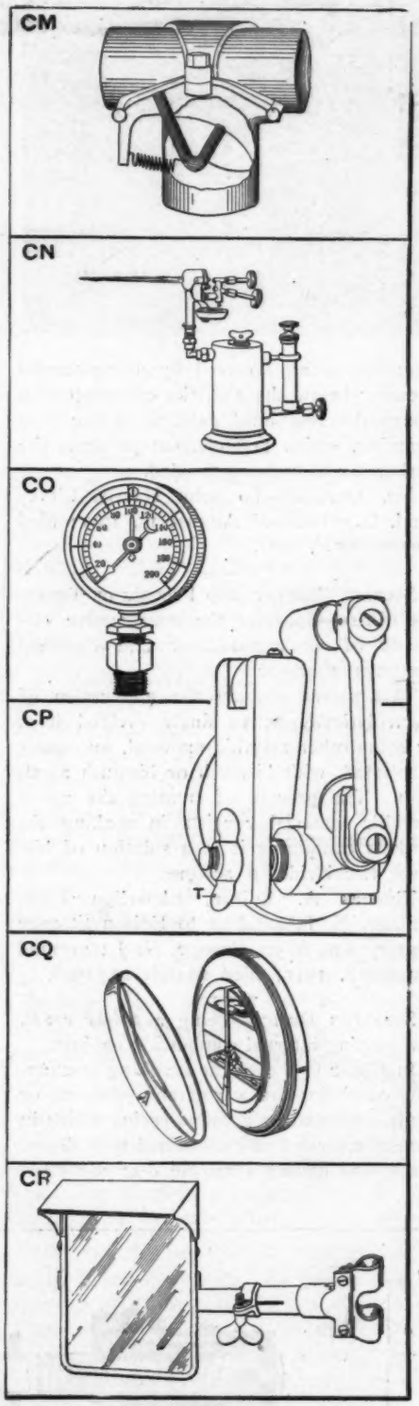
Fig. 3—J. Harris' non-floodable carbureter

Seen in the Show Window

THE Stryker muffler cut-out, which is shown in Fig. CM, is easily attached to the exhaust pipe. A round hole is cut into the exhaust lead, and the body of the cut-out, which is seen in the figure below the exhaust pipe, is brought to bear against the opening so that the exhaust gases may freely enter the cut-out space. Then the cap of the cut-out is fitted around the portion of the exhaust pipe directly above the hole cut in it, and cut-out cap and body are joined by means of cap screws, one of which is shown in the accompanying illustration. The cut-out pipe, under normal circumstances, is closed by a butterfly held in position through a spring, but when the lever attached to the butterfly valve is pulled toward the motor—to the right in the illustration—the metal plate forming the valve is brought into such a position as to permit the exhaust of the motor to pass through the cut-out, instead of flowing through the muffler. The Stryker cut-out is operated by means of a cable and snap, actuated through a bronze pedal from the driver's seat. The cut-out is the product of C. W. Stryker, of 314 E. Onondaga street. Syracuse, N. Y.

AT CN the Turner double-jet alcohol blowpipe is illustrated. The burner is mounted on a compound swivel so that the flame may be pointed in several divers directions. The tank is filled with alcohol which serves as the fuel, and instead of bellows being used, the air necessary to produce the needle-pointed flame is pumped into the flame by means of the hand pump arranged in the handle. The maker, Turner Brass Works, Sycamore, Ill., claims that a temperature of 3,000 degrees may be produced through the use of this torch.

COMPRESSION is an indicator of some important engine conditions and to measure its amount the Edelmann compressometer, illustrated at CO, has been constructed. The principle of this meter is not unlike to that of the tire gauge. For testing the compression of a cylinder, the spark plug is removed therefrom and the compressometer, which comes in all standard spark plug threads, inserted in its place. Then with the ignition cut off the engine is once turned over by the flywheel, and the compression in pounds which shows on the dial is noted. The operation is repeated on all the cylinders, so that in case one of them is at fault the fact will become obvious. A red hand records maximum compression. E. Edelmann & Co., of 49 West Kinzie street, Chicago, Ill., manufacture this device.



CM—Manner of Attaching Stryker Cut-out to Muffler
CN—Turner Double-Jet Alcohol Type of Blowpipe
CO—Edelmann Compressometer is Made in Spark Plug Threads
CP—Hart-Giant Tire Pump is Driven by the Motor
CQ—Argos Mirror Shows the Driver, the Cars Following Him
CR—Star Tire and Tool Case is of Large Capacity

THAT it will pump a tire up to 90 pounds in a very short space of time with hardly any work on the part of the operator, is the claim made for the Hart Giant tire pump (CP). As the illustration shows, this pump consists of a cylinder in which a plunger is reciprocated by the action of a crankshaft rotated by a driving wheel. The pump is so mounted on the chassis frame by means of two brackets that the wheel of the pump comes in driving contact with the face of engine flywheel, if the thumb-screw T is given a turn. The 12-foot hose connection is connected up to the tire to be inflated, and the engine started and run at slow speed. A slight adjustment of the thumb-screw then brings pump wheel and flywheel into contact, whereby the plunger of the pump is reciprocated in its cylinder, compressing the air sucked therein, which is then led to the tire. The pump is made by Hart & Widder Co., 511 West Twenty-first street, New York.

CAPACITY of the "Star" tire and tool case, made by the Merchant & Evans Company, of Philadelphia, Pa., is two shoes, two inner tubes in inflated state, in addition to from four to six folded tubes, and separated by a partition from a space for spare tools and like apparatus. The "Star," which is shown at CQ, is light of weight, its metal skeleton being covered with a waterproof fabric. The illustration shows the inner space divided for tubes above and tools below a partition, while the shoes are strapped to the body of the case in the manner shown. A hook and the bottom and two side latches, together with a lock on the top, keep the contents of the case protected from theft or loss.

LOOKING backward for the cars following one's trail is the chauffeur's work at times, but this work is as uncomfortable as it is fraught with risk. To enable the driver to see the rear of the road without turning his eye away from the portion before him, the Argos mirror, shown at CR, is attached to the windshield post by means of the positive-grip bracket seen in the figure made of brass. The shaft contains a ball-and-socket joint, permitting the mirror to be brought into and held in almost any desirable position. The glass is a high bevel plate and so fastened to the frame that it may be replaced without difficulty. One of the main features of this mirror is the ease with which the frame may be removed from its shaft, to which it is held by a thumb-screw. This mirror is made by the Motor Car Equipment Company, of 55 Warren street, New York.